



University of Toronto

FINAL
EXAMINATION PAPERS

1912

UNIVERSITY PRESS
TORONTO

Book No.

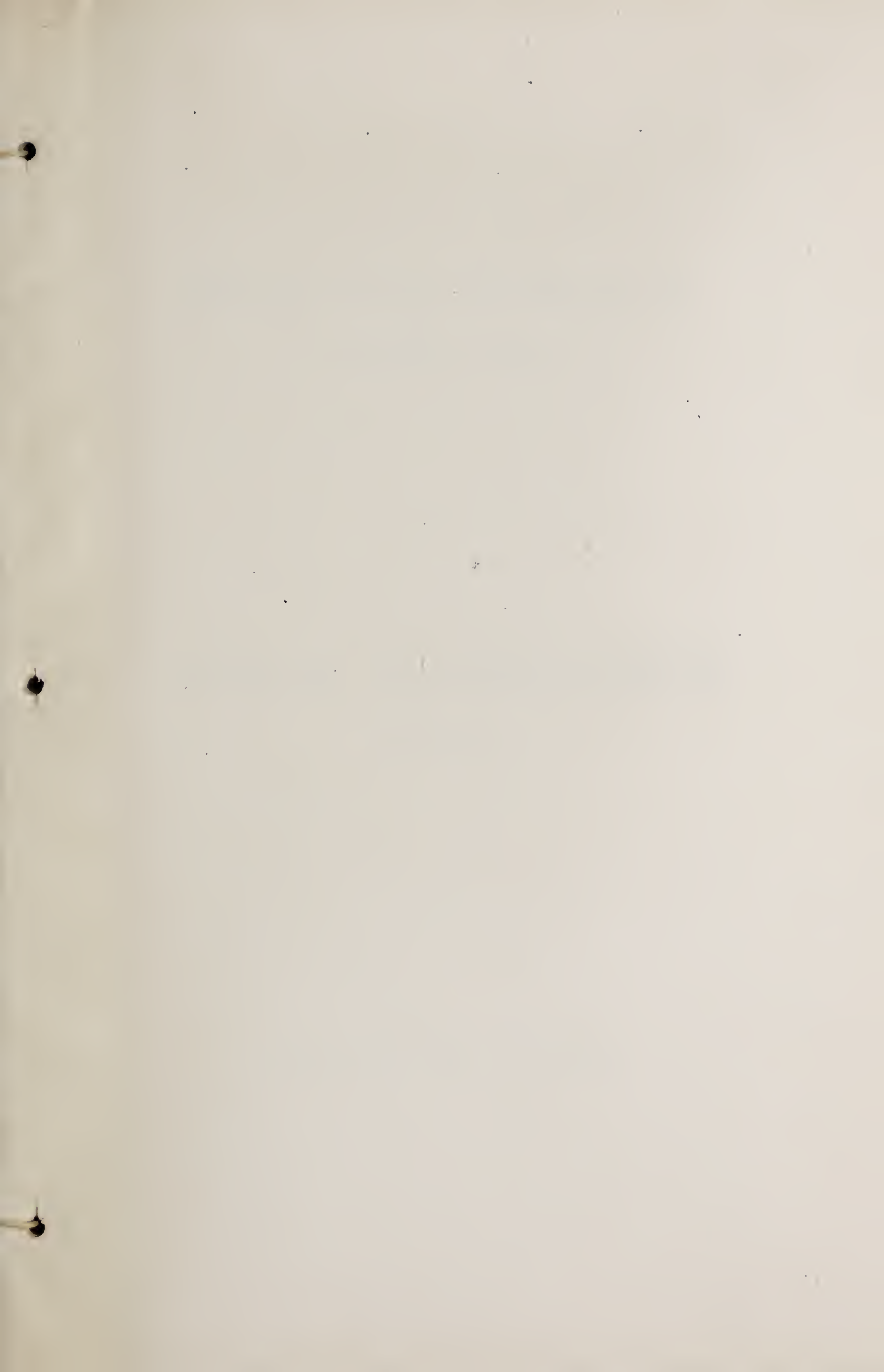


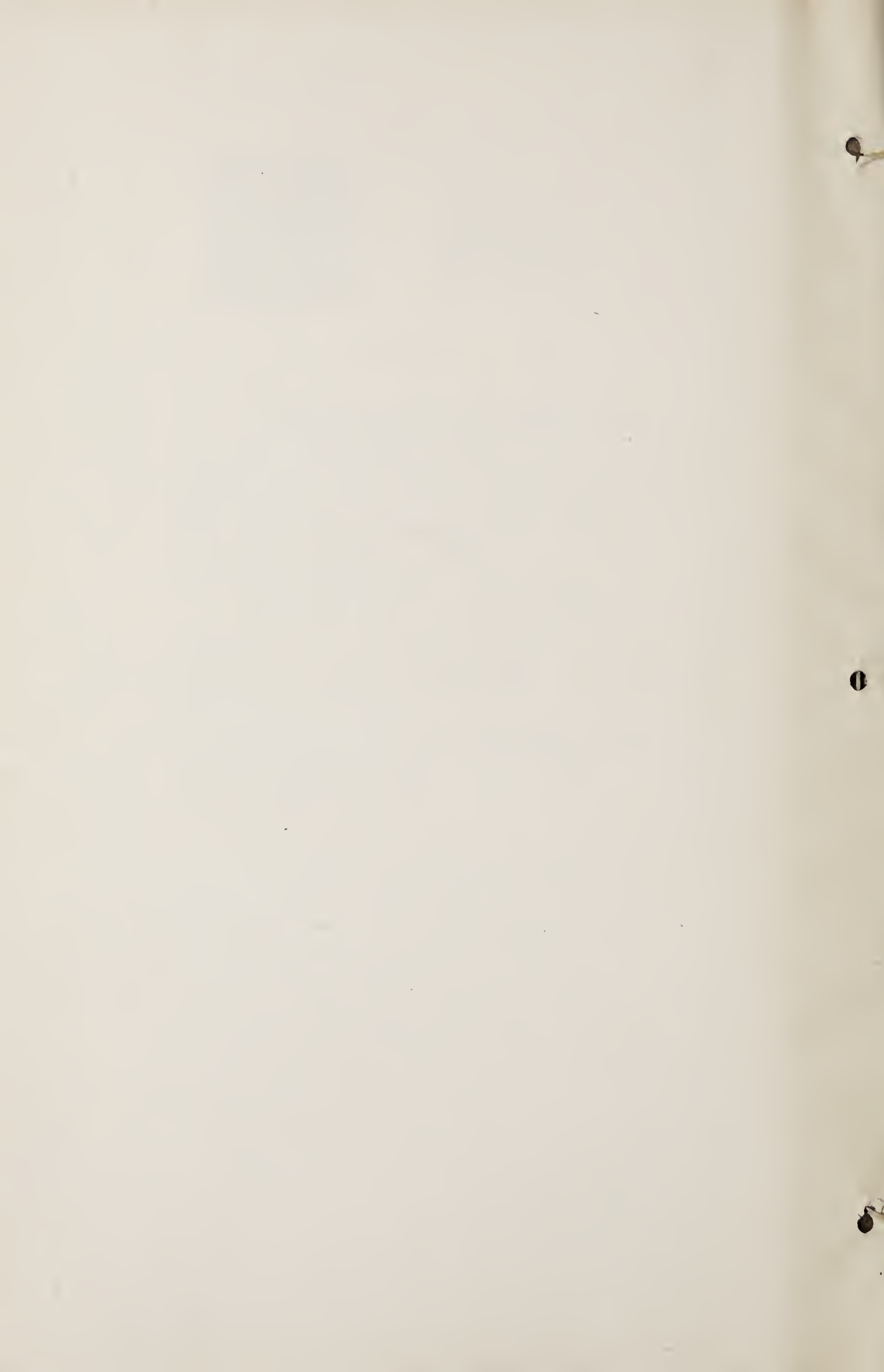
ROYAL
COLLEGE
OF DENTAL
SURGEONS.

LIBRARY

Books may be retained for one week and may be renewed once if no application has been registered for them. For longer detention a fine of 5 cents per day will be imposed.

The Librarian shall examine every book returned and if the same be found marked, spotted with ink, with leaves turned down or in any way injured, the borrower shall pay the value of the book.





University of Toronto

Faculty of Arts.

ANNUAL EXAMINATIONS
1912.

FOURTH YEAR.

GREEK AUTHORS.

GENERAL.

Examiner—MAURICE HUTTON.

Translate literally :

(a) Lucian, Zeus Tragoedus, 48-50, 695-698.

(b) Demosthenes, 1st Philippic, 24-27, 46-47.

(c) (1) Aristophanes, Birds, 1553-1564.

(2) *Ibid.*, 708-722.

2. Parse fully :

(a) μαστιγίαν—κατειληφότα—διαρκῆ—καλωδίω—πλησίσι-
τιος.

(b) παρακύψαντα—διδόντα—στρατηγουμένων—καταστήσαν-
τας—ἦν (before ὡς ἀληθῶς).

(c2) ῥιγῶν—ἀποδύη—φανείς.

3. The slang of Lucian's age is sometimes like our own : translate into his Greek "very like a whale" "to whale a man."

4. In *c*, explain προὔλιπε: who were Chaerephon and Peisander? What is supposed to be the point of this passage? In (c2) who was the Orestes here mentioned?

5. Who are the heroes of the Birds, and what do their names signify? What is the capital of the Birds' kingdom?

BUTCHER'S ESSAYS.

6. Explain the following quotations from Butcher's essays :

(a) In the Greek spirit we recognize the distinctive features of Western thought.

(b) The law of the Greeks was at once the Law and the Prophets of the Hebrews.

(c) Plato and the Greeks generally distrusted books and writing.

(d) Delphi at the supreme crisis of Greek history could not rise above timid and temporising counsels.

(e) The geographical origin of the great thinkers of Greece was not at first in Greece proper but in the colonies and Magna Graecia.

(f) "In the division between thought and deed Demosthenes truly saw the flaw that was destined to impair Greek conduct and character."

To what speeches of Demosthenes do these words refer?

(g) "Eccentricity tinged with vice" has been suggested as a definition of—what?

GREEK.

TRANSLATION AT SIGHT AND GRAMMAR.

THIRD AND FOURTH YEARS—GENERAL.

Examiner—J. C. ROBERTSON, M.A.

1. Translate:

ΛΥΚΙΝΟΣ. Εἰπέ μοι, ὦ Κράτων, καὶ τόδε περὶ ὀρχήσεως καὶ τῶν ἐν τῷ θεάτρῳ γινομένων, πότερον ἰδὼν πολλάκις αὐτὸς ἐπιτιμᾶς, ἢ ἀπείρατος ὢν τοῦ θεάματος ὅμως αἰσχρὸν αὐτὸ καὶ κατὰπτυστον, ὡς φῆς, νομίζεις; εἰ μὲν γὰρ εἶδες, ἐξ ἴσου ἡμῖν καὶ σὺ γεγένησαι· εἰ δὲ μὴ, ὄρα μὴ ἄλογος ἢ ἰπιτίμησις εἶναί σου δόξη καὶ θρασεῖα κατηγοροῦντος ὢν ἀγνοεῖς.

ΚΡΑΤΩΝ. Ἄλλ' ἄρα μὴ νομίζεις ἂν ἐμοὶ πρέπειν, ἐν βαθεῖ τούτῳ τῷ πάγωνι καὶ πολιᾷ τῇ κόμῃ καθῆσθαι μέσον ἐν τοῖς μεμνηόσιν ἐκείνοις θεαταῖς, κροτοῦντά τε προσέτι καὶ ἐπαίνους ἀπρεπεστάτους ἐπιβοῶντα ἀναισχύντῳ τινὶ βωμολόχῳ ἐς οὐδὲν δέον ὀρχουμένῳ ἢ ὑποκρινομένῳ;

ΛΥΚΙΝΟΣ. Βούλει οὖν ἀφέμενος, ὦ ἑταῖρε, τῶν βλασφημιῶν τούτων, σκουσαί μού τι περὶ ὀρχήσεως λέγοντος καὶ τῶν ἐν αὐτῇ καλῶν, καὶ ὡς οὐ τερπνὴ μόνον ἀλλὰ καὶ ὠφελίμη ἐστὶ τοῖς θεωμένοις, καὶ ὅσα παιδεύει καὶ ὅσα διδάσκει, καὶ ὡς ῥυθμίζει τῶν ὀρώντων τὰς ψυχὰς, κοινόν τι ψυχῆς καὶ σώματος κάλλος ἐπιδεικνυμένη;

ΚΡΑΤΩΝ. Ἐμοὶ μὲν οὐ πάνυ σχολὴ μεμνηότος ἀνθρώπου ἀκροᾶσθαι τὴν νόσον τὴν αὐτοῦ ἐπαινοῦντος.

ὀρχησις—dancing.

ἐπιτιμάω—censure.

κατὰπτυστος—abominable.

πώγων—beard.
πολιός—gray, hoary.
μαίνομαι—am mad.
κροτέω—clap.
ἀφίεμαι—put aside.

2. Translate:

Simonides of Ceos, IV.

μνήστις—remembrance.
ἐντάφιον—shroud.
εὐρώς—mould.
ἀμανρόω—destroy.
σηκός—sepulchre.
οικέτης—inmate; translate 'to dwell therein.'
ἀέναος—derived from αἰεί.

3. Decline in the singular and plural μείζων ναῦς, μέγα καὶ ἀσφαλὲς κτήμα; and give the nom. and gen. singular in all genders of οὐδείς, ὅστις, πολὺς, ἅπας, λυθείς, λελυκώς, διδούς.

4. Give the three degrees of comparison of the adjectives meaning: easy, difficult, terrible, wise, prudent, true, much (many), ugly (base); and of the adverbs meaning: well, much (very), near, swiftly.

5. Distinguish the meaning of the active and middle voices of αἰρέω, φαίνω, ἀμύνω, πείθω, συμβουλεύω, παύω, γράφω.

6. Write out the indicative (in all numbers) and the mood synopsis of the following: οἶδα; εἶδον; the aorist active of δίδωμι; the 2nd aorist middle of τίθημι; the present active of τιμάω; the 1st aorist passive of ἐκλύω.

7. State concisely the rules of syntax governing the following: consecutive (or result) clauses; genitive, dative and accusative of time; future conditions; indefinite temporal clauses; οὐ and μὴ with the infinitive; the construction of the verbs meaning (a) to fear, (b) to order, ask, advise, etc., (c) to strive, take care, etc.

GREEK PROSE.

THIRD AND FOURTH YEARS—HONOURS.

Examiner—MAURICE HUTTON.

Translate into idiomatic Greek:—

His appeal found a ready response. Hundreds of young Italians, fired by his own passion, gave themselves to the dangers and toils and the thousand small annoyances of a conspirator's life. It was no light call. "I know of no existence," said one of them in later life, "which requires such continual self-abnegation and endurance. A conspirator has to listen to all sorts of gossip, to soothe every variety of vanity, discuss nonsense seriously, feel sick and stifling under the pressure of empty talk, idle boasting, and vulgarity, and yet maintain an unmoved and complacent countenance. A conspirator ceases to belong to himself, and becomes the toy of anyone he may meet; he must go out when he would rather stay at home, and stay at home when he would rather go out; he has to talk when he would be silent, and to hold vigils when he would rather be in bed."

GREEK SIGHT.

HONOUR.

Examiner—ADAM CARRUTHERS, M.A.

1. Translate:
Plato, *Laws*, Bk. VI, 770, B.
2. Translate:
Sophocles, *Ajax*, vv. 835-865.

GREEK.

PLATO REPUBLIC.

HONOUR.

Examiner—MAURICE HUTTON.

1. What is Plato's attitude to the virtues respectively of
(a) truth speaking
(b) truth seeking.

What was the attitude historically of the Greek world to these virtues?

2. Explain briefly the Platonic parables
(a) of the Sower and the Seed (book VI)
(b) of the Supposititious Son (end of book VII)
(c) of the Old Sea Captain and the Crew (book VI)
(d) of the Prisoner in the Cave (book VII). How is this anticipated in book VI?
(e) of the Triple Beast in human form (book IX).

3. Trace briefly the decadence of the individual soul from generation to generation when the ideal government has failed (book VIII and IX).

4. Pick out the most obvious references to Sparta in the last six books of the Republic.

5. Translate carefully :

(a) Rep. V, 459 B-D.

Explain the article referred to in the last line.

(b) *Ibid.*, VII, 531 A-C.

Who are ἐκείνους of line 10?

(c) *Ibid.*, VIII, 549 E-550 A.

What is the context of this passage?

(d) *Ibid.*, IX, 582 A and B.

Do you find the argument quite convincing?

(e) *Ibid.*, X, 603 C and D.

How does this passage fit into the general argument of this book?

6. "But to the life of morality without philosophy Aristotle assigns but a second place; differing indeed there from Plato, who, holding that by moral virtue a man becomes like to God, exhibits a deeper insight than Aristotle."

Discuss the correctness of this statement.

GREEK.

HONOUR.

Examiner—ADAM CARRUTHERS, M.A.

1. Translate :

(a) Thucydides, Bk. I, Ch. 75.

(b) Thucydides, Bk. III, Ch. 82.

(c) Thucydides, Bk. VII, Ch. 71.

2. Translate :
 - (a) Herodotus, Bk. VIII, Ch. 59.
 - (b) Herodotus, Bk. IX, Ch. 48.
3. Translate :
Demosthenes, Philippic I, 40.

GREEK.

AESCHYLUS, ARISTOPHANES, THEOCRITUS.
HONOUR.

Examiner—A. L. LANGFORD.

1. Translate :
 - (a) Aeschylus, Agamemnon, vv. 358-375.
 - (b) *Ibid*, vv. 1302-1313.
2. In (a); Who is *τις*? Explain mood of *πατοῖθ'*. What form is *πέφανται*?
3. What is the connection of (b)?
4. Write briefly on the part played by the chorus in the *Agamemnon*.
5. What is Aeschylus' view on the family curse?
6. Translate :
Aristophanes, Frogs, vv. 686-705.
7. Write notes on the political references in these lines.
8. Scan the first three lines and name the metre.
9. What according to Aristophanes was "the moral office of the poet"?
10. Locate the following lines :
 - (a) ἕτεροι γὰρ εἰσιν οἷσιν εὐχομαι θεοῖς,
 - (b) ἀπὸ ληκυθίου σου τοὺς προλόγους διαφθερῶ.
 - (c) ἀναβιώην νυν πάλιν.
 - (d) ἡ γὰρ θεός σ' ὡς ἐπύθεθ' ἤκοντα, εὐθέως
ἔπεπτεν ἄρτους.
 - (e) τίς οἶδεν εἰ τὸ ζῆν μὲν ἐστι κατθανεῖν,
τὸ πνεῖν δὲ δειπνεῖν, τὸ δὲ καθεύδειν κώδιον;
11. Translate :
 - (a) Theocritus, Idyll VII, vv. 21-26.
 - (b) *Ibid.*, Idyll XV, 100-108.
 - (c) *Ibid.*, Idyll XXI, vv. 29-37.
12. In (a), give Attic for Doric forms.
13. What is the connection of (b)?
14. Sketch briefly the history of the pastoral elegy.

POETICS OF ARISTOTLE.

HONOUR CLASSICS.

Examiners { NORMAN W. DEWITT, PH.D.
H. T. F. DUCKWORTH.

Translate:

Aristotle Poetics, Butcher's text, xiii, ll. 22-30.

By what means is the highest tragic effect to be obtained?

2. *Ibid.*, viii, ll. 22-36.

What mistaken opinion is controverted in this chapter?

3. (a) Quote, in Greek, Aristotle's definition of Tragedy.

(b) Outline a discussion of the meaning of *κάθαρσις*.

4. Discuss three only of the following:

(a) διὸ καὶ φιλοσοφώτερον καὶ σπουδαιότερον ποιήσεις ἱστορίας ἐστίν.

(b) αἰεὶ μὲν ὁ μείζων μέχρι τοῦ σύνδηλος εἶναι καλλίων ἐστὶ κατὰ τὸ μέγεθος.

(c) ἡ γὰρ τραγῳδία μίμησις ἐστὶν οὐκ ἀνθρώπων ἀλλὰ πράξεως.

(d) Marcus Antonius as a possible tragic hero.

(e) The relative importance of plot and character.

(f) "Comedy makes all characters general, tragedy particular."

Write on two in group A and one in group B.

A.

1. Μίνως γὰρ παλαίτατος ὢν ἀκοῆ ἴσμεν ναυτικὸν ἐκτήσατο καὶ τῆς νῦν Ἑλληνικῆς θαλάσσης ἐπὶ πλείστον ἐκράτησε.

2. The importance of Lydia in Greek History.

3. The mutual intercourse and influence of Thracians and Hellenes.

4. The relation of 'Nature-gods' to 'heroes' in Greek religion.

B.

1. Greek funeral customs and their significance.
2. The after-effects of the Macedonian Conquest in Syria and Egypt.
3. The reaction of colonization and commerce upon politics in Greece.
4. Distinguish the influence of political, as apart from social or economic causes, in the overthrow of Greek liberty.

GREEK PHILOSOPHY.

ARISTOTLE POLITICS II.

HONOUR CLASSICS.

Examiners { MAURICE HUTTON.
 { G. S. BRETT.

I.

1. Translate carefully :
 - (a) Arist. Politics II, Ch. 12, 1273, b 35-1274 a 18.
 - (b) *Ibid.*, Ch. 5, 1263, b 36-b 40.Explain the context of this passage: what is meant by “*τοῖς τοιούτοις*” and by “*τοῖς νόμοις*”?
2. State briefly :
 - (a) The gist of Aristotle’s criticism of Phaleas.
 - (b) The concluding and most important portion of his chapter on Hippodamus. What is noteworthy and advanced in that proposed legal system?
3. What is Aristotle’s criticism of Platonic co-education? in what way is this criticism specially characteristic of Aristotle’s mind and method?

OR

Give a brief summary of Aristotle’s criticism of Cretan magistracies and institutions as compared with those of Sparta.

5. "The new doctrine of universal philanthropy is false because local neighborhood of all men is impossible *vi terminorum*, and a widening out of the feelings that usually prevail between local neighbours would only make those feelings thin and watery."

—Dr. Parr's Sermon against Godwin's doctrines.
(Easter Tuesday, 1800).

Note the parallel passage in Aristotle's second book. Who was Aristotle's "Godwin"? and what is his word for "watery"?

6. "All the Socratic dialogues have distinction, charm, originality, speculativeness." Translate back into the original Greek.

II.

1. What moral ideas were prevalent in Greece before the time of Plato?

2. Compare the doctrines of Plato and Aristotle with respect to (a) the definition of virtue, (b) the ideal life.

3. To what extent did Socrates influence Greek ethical theory from Plato to the Stoics.

4. Discuss the psychology of ethics as given in Republic Book iv. Trace the development of that psychology in and after Aristotle.

5. Discuss the Greek idea of the value of pleasure as shown by the writings of Plato, Aristotle, and Epicurus.

6. State and explain the chief theories of the universe maintained by pre-Socratic thinkers.

ARISTOTLE, POLITICS III, IV, V.

HONOUR.

Examiner—H. T. F. DUCKWORTH.

Write on *a* 1 and *three* only of 2-6.

1. Translate, with illustrations from history:

(a) III, 2, 1275, *b* 21-33.

(b) IV (VII), 1333, *b* 37-1334, *a* 10.

(c) V (VII), 1340, *a* 23-38.

2. Discuss the place and function of Art in τὸ εὖ ζῆν.

3. Apply the Aristotelian canon of good citizenship to (a) Pericles, (b) Socrates, (c) Sulla, (d) Caesar.
4. Comment upon the following :
 - (a) IV (VII), 7, 1327, b 32.
 - (b) IV (VII), 9-1329, a 28.
5. Examine and account for Aristotle's theory of slavery.
6. Aristotle's estimate of sea-power.

COMPARATIVE SYNTAX.

HONOUR CLASSICS.

Examiner—A. J. BELL, M.A., Ph.D.

NOTE.—Candidates will take *nine* of these questions, one of which must be question 12.

1. Name and describe the parts of speech as enumerated by Dionysius Thrax. Notice any later additions to his list, and write explanatory notes on the terms ἀπαρεμφατὸν, and *accidentia*.

2. How far is gender properly defined as distinction of sex? How does the correspondence between gender and sex arise? Write notes on the gender of ἵππος and ἵπποι, ἡμᾶρ and ἡμέρα, and on the nature of the ending in οἰκία, ἡδεΐα and *materies*.

3. Compare the endings of the nominative dual in Greek with those in Sanskrit, noticing any later development in Greek. Write notes on the use of the plural in *Veii*, ἀκούετε λεῶ, *nonae*, ἔστι οἷς βελτίον τεθνάναι ἢ ζῆν, νῆα ἰθύνετε, φαίδιμ' Ὀδυσσεῦ.

4. Give and account for the Greek and Latin names of the cases, and connect each with what seems the primary use of its case. Give arguments for and against regarding the vocative as a case.

5. Trace the origin of, and describe the absolute cases in Greek and Latin, comparing their uses with the Sanskrit use. Show by examples how the ideas of *place*, *instrument*, and *agent* are expressed in Greek and Latin, accounting for the differences.

6. Trace the development of the passive voice in Greek and Latin. Give Delbrück's theory of the primary distinction between the active and the middle. Write notes on the voice of δύναμαι, μέμνηνα, θεύσομαι, τaráζομαι, and on the ending of *vidi*.

7. Write notes on the nature and origin of the endings of *τίθης*, *ἐφάνην*, *εἰμι*, *ἔτυψεν*, *ἐβεβουλεύκειν*, *essem*, *videram*, *sequeris*, and *edit*.

8. Compare Greek and Latin with regard to the following uses: the historical present, the voluntative future, the gnomic aorist, and the dative of goal. How does the use of the pluperfect and future perfect in Greek differ from their use in Latin?

9. Lobeck recognizes that *ἔσθη* is like *ἔφη*, and thinks it originally an imperfect of a present *στήμι*. Discuss the relation of the imperfect to the aorist, and describe the descriptive imperfect in Homer.

10. Compare the formation of the subjunctive and the optative in Greek, and give a table of their meanings in principal sentences. Give reasons for thinking that both are primarily futures.

11. Give a table of examples to illustrate the syntax of conditional sentences in Greek and Latin. How does the expression of unreal conditions in Homer and Plautus differ from that in Xenophon and Cicero? To what does the difference seem to point?

12. Write syntactical notes on the words or phrases underlined in any ten of the following:—

(a) Iovi bovid placum dato.

(b) πολλὰς δ' ἰφθίμους ψυχὰς Ἀΐδι προΐαψεν.

(c) Legati ab Ardea Romam venerunt,

(d) ἃ ἐπράσσετο οὐκ ἐγένετο.

(e) Tu si hic sis, aliter sentias.

(f) Ἀτρείδη, σὺ δὲ παῦε τεδὸν μένος.

(g) Quid refert intra naturae fines viventi?

(h) Ἐλένην κτάνωμεν, Μενέλεω λύπην πικράν.

(i) Diutine uti bene licet partum bene.

(j) αἶ κ' ἀποκηδήσαντε φερώμεθα χεῖρον ἄεθλον.

(k) postea operito terra radicibus fini, deinde calcato pedibus bene.

(l) πολλὺς δ' ἀμφ' ὄστεόφιν θῆς ἀνδρῶν πυθομένων.

(m) nominandi istorum tibi erit magis quam edundi copia.

(n) τὸ τε ληστικὸν καθήρει τοῦ τὰς προσόδους μᾶλλον ιέναι αὐτῷ.

(o) Quia illim, unde huc advecta sum, malis bene esse solitumst.

(p) ἀθλιώτερόν ἐστι μὴ ὑγιοῦς σώματος μὴ ὑγιεῖ ψυχὴ συνοικεῖν.

(q) si plus de triginta pedibus patuerit.

(r) καὶ οἱ μὲν Ἀθηναῖοι ἀφ' ἐσπέρας εὐθὺς τούτῳ τῆ τροπῶ ἀτελεῖ τῇ νίκῃ ἀπο τῆς Μιλήτου ἀνέστησαν.

(s) Οὐ σοι μὴ μεθέψομαί ποτε.

LATIN.

LUCRETIUS, CICERO, ARISTOTLE.

HONOUR.

Examiners { G. W. JOHNSTON, PH.D.
J. C. ROBERTSON, M.A.
G. S. BRETT, M.A.

1. Translate:

Nec tamen undique corporea stipata tenentur
omnia natura; namque est in rebus inane.
quod tibi cognosse in multis erit utile rebus
nec sinet errantem dubitare et quaerere semper
de summa rerum et nostris diffidere dictis.

(a) Has the existence of *corporea natura* anywhere been dealt with by the poet?

(b) Examine the 'discontinuity of matter' in Lucretius and in modern science.

2. Translate:

Nunc age quod superest cognosce et clarius audi.
nec me animi fallit quam sint obscura: sed acri
percussit thyrsos laudis spes magna meum cor
et simul incussit suavem mi in pectus amorem
musarum, quo nunc instictus mente vigenti
avia Pieridum peragro loca nullius ante
trita solo. iuvat integros accedere fontis
atque haurire, iuvatque novos decerpere flores
insignemque meo capiti petere inde coronam
unde prius nulli velarint tempora musae;

(a) Is this poetry? - Give reasons. *Velarint*—mood and tense.

3. Translate:

ergo dissolui quoque convenit omnem animai
naturam, ceu fumus, in altas aeris auras;
quandoquidem gigni pariter pariterque videmus
crescere et, ut docui, simul aevo fessa fatisci.

(a) Remark on the nature or sufficiency of the proof.

4. Translate:

Nil igitur mors est ad nos neque pertinet hilum,
quandoquidem natura animi mortalis habetur.
et velut anteacto nil tempore sensimus aegri,
ad conflagrandum venientibus undique Poenis,
omnia cum belli trepido concussa tumultu
horrida contremuere sub altis aetheris oris,
in dubioque fuere utrorum ad regna cadendum
omnibus humanis esset terraque marique,
sic, ubi non erimus, cum corporis atque animai
discidium fuerit quibus e sumus uniter apti,
scilicet haud nobis quicquam, qui non erimus tum,
accidere omnino poterit sensumque movere,
non si terra mari miscēbitur et mare caelo.

5. Explain in what sense or senses Lucretius uses the following terms: *concilium*, *eventa*, *cacumen*, *genitalis materies*, *inane*.

6. Comment on the following without translation:

(a) quippe ubi materies omnis *cumulata iaceret*
ex infinito iam tempore *subsidente*.

(b) omne quidem vero nil est *quod finiat* extra.

(In how far do Lucretius and modern physicists agree as to the Infinity of the Universe?)

(c) Sed Tityos nobis *hic* est.

Sisyphus *in vita quoque* nobis ante oculos est.

7. Write on *one* only:

(a) 'The influence of Lucretius has been twofold, as a poet and as a philosopher.'

(b) How far does a materialistic doctrine of the Universe involve denying (a) freedom of will, (b) immortality of the soul?

II.

(Write in a separate book.)

1. Translate:

(a) Nec enim gubernationi aut medicinae similem sapientiam esse arbitramur, sed actioni illi potius quam

modo dixi et saltationi, ut in ipsa insit, non foris petatur extremum, id est artis effectio. Et tamen est etiam alia cum his ipsis artibus sapientiae dissimilitudo, propterea quod, in illis quae recte facta sunt, non continent tamen omnes partes, e quibus constant; quae autem nos aut recta aut recte facta dicamus, si placet, illi autem appellant *κατορθώματα*, omnes numeros virtutis continent.

(b) Quoniam enim videmus esse quiddam, quod recte factum appellemus, id autem est perfectum officium, erit etiam inchoatum, ut, si iuste depositum reddere in recte factis sit, in officiis ponatur depositum reddere; illo enim addito 'iuste' fit recte factum, per se autem hoc ipsum reddere in officio ponitur.

2. Explain the Stoic doctrine of *κατορθώματα* after Cato, and show their place in the Stoic system of ethics. What other relation of *κατορθώματα* and *καθήκοντα* than that indicated in extract (b) is more prominent in Cato's account?

3. What use is made by Cato in Book III of the following similes to illustrate his position?

(a) the man, cui propositum est conliniare hastam aliquo aut sagittam.

(b) si cothurni laus illa esset ad pedem apte convenire.

(c) qui demersi sunt in aqua.

(d) ita jacere talum ut rectus assistat.

4. Translate:

Mihi autem aequius videbatur Zenonem cum Polemone disceptantem, a quo, quae essent principia naturae, acceperat, a communibus initiis progredientem videre, ubi primum insisteret, et unde causa controversiae nasceretur, non stantem cum iis, qui ne dicerent quidem sua summa bona esse a natura profecta, uti isdem argumentis, quibus illi uterentur, isdemque sententiis.

5. (a) *a communibus initiis progredientem*. To what does Cicero refer?

(b) *Cum iis*. Who are meant? What theories of the *summum bonum* did they respectively hold?

6. Show how far the extract in question 4 embodies Cicero's main criticism of Stoicism.

7. Translate:

(a) Τίνι γὰρ δυσχεραίνεις; τῇ τῶτ ἀνθρώπων κακία; ἀναλογισάμενος τὸ κρῖμα, ὅτι τὰ λογικὰ ζῶα ἀλλήλων ἕνεκεν γέγονε, καὶ ὅτι τὸ ἀνέχεσθαι μέρος τῆς δικαιοσύνης, καὶ ὅτι ἄκοντες ἀμαρτάνουσι, καὶ πόσοι ἤδη διεχθρεύσαντες, ὑποπτεύσαντες, μισήσαντες, διαδορατισθέντες, ἐκτέτανται καὶ τετέφρωνται, παύου ποτέ.

(b) Ὁ χεῖρω αὐτὸν ἑαυτοῦ ἄνθρωπον οὐ ποιεῖ, τοῦτο οὐδὲ τὸν βίον αὐτοῦ χεῖρω ποιεῖ, οὐδὲ βλάπτει, οὔτε ἕξωθεν, οὔτε ἔνδοθεν.

(c) Μὴ τοιαῦτα ὑπολάβανε, οἷα ὁ ὑβρίζων κρίνει, ἢ οἷα σε κρίνειν βούλεται· ἀλλ' ἴδε αὐτά, ὅποια κατ' ἀλήθειάν ἐστι.

(d) Ἀμαρτάνει τις; ἑαυτῷ ἀμαρτάνει.

(e) Πᾶν τὸ συμβαῖνον οὕτως σύνηθες καὶ γνώριμον, ὡς τὸ ῥόδον ἐν τῷ ἔαρι, καὶ ὀπώρα ἐν τῷ θέρει. τοιοῦτον γὰρ καὶ νόσος καὶ θάνατος, καὶ βλασφημία, καὶ ἐπιβουλή, καὶ ὅσα τοὺς μῶρους εὐφραίνει ἢ λυπεῖ.

8. Using the material given in these extracts, discuss the Stoic attitude to sin and the sinner.

9. Write on *one* of the following:

(a) "The Stoicism of the Roman period was largely eclectic."

(b) The relation of the cosmic theory of the Stoics to their ethical speculations.

(c) The Stoic argument for ἀπάθεια.

(d) Common aspects of Stoicism and Epicureanism.

III.

(To be written in separate book.)

1. Translate:

(a) Aristotle, Ethics, Bk. v, Ch. 7, § 1.

(b) *Ibid.*, Bk. vi, Ch. 7, § 3.

(c) *Ibid.*, Bk. vii, Ch. 2, § 9.

2. Write as fully as possible on *two* of the following:

(1) Aristotle's treatment of legal responsibility.

(2) The Idea of Justice as the basis of social life (especially in reference to exchange of produce and public safety).

(3) The moral faculty according to Aristotle, compared with any other views of the part played by reason in morality.

(4) Ancient ideas on moral perversions (*ἕξεις . . . τὰς θηριώδεις*).

(5) Illustrate from Book vii. the ways in which Greek Philosophers attempted to solve the contradiction of reason and feeling.

(6) The problem of the Good in relation to Pleasure.

FUSTEL DE COULANGES.

Examiner—W. S. MILNER, M.A.

1. Write notes on the following:

Confarreatio, rex sacrificulus, 'creat consules', census, Voconian Law, patres conscripti, ostracism, public meals, patronus, condere urbem.

2. Compare ancient religious sentiment in the daily life of a Roman with that of the ancient Athenian.

3. The character of Aeneas.

4. The first written code of law in the city state.

5. Describe and explain the similarity of class structure in the ancient city State and the process by which it finally breaks up.

LATIN AUTHORS.

GENERAL.

Examiner—G. W. JOHNSTON, PH.D.

NOTE:—Candidates will take A and *either B or C*. In A *either 1 or 2* may be taken.

1. Translate: A.

Felicem dicere non hoc
me possim, casu quod te sortitus amicum:
nulla etenim mihi te fors obtulit; optimus olim
Vergilius, post hunc Varius dixere quid essem.
Ut veni coram, singultim pauca locutus

(infans namque pudor prohibebat plura profari)
no ego me claro natum patre, non ego circum
me Satureiano vectari rura caballo,
sed, quod eram, narro. Respondes, ut tuus est mos,
pauca; abeo, et revocas nono post mense iubesque
esse in amicorum numero.

(a) Account for the case of *patre*. What does Horace tell us of his father? Who is meant by *te* (l. 2)? Give some account of the poet's relations with him.

(b) Point out anything noteworthy in l. 6. What exactly is the meaning of *non . . . caballo*?

2. Translate:

Misere discedere quaerens,
ire modo ocius, interdum consistere, in aurem
dicere nescio quid puero, cum sudor ad imos
manaret talos. 'O te, Bolane, cerebri
felicem'! aiebam tacitus, cum quidlibet ille
garriret, vicos, urbem laudaret. Ut illi
nil respondebam, 'misere cupis,' inquit, 'abire;
iamdudum video; sed nil agis; usque tenebo;
prosequar hinc quo nunc iter est tibi.' Nil opus est te
circumagi: quendam volo visere non tibi notum;
trans Tiberim longe cubat is prope Caesaris hortos.'
'Nil habeo quod agam et non sum piger; usque sequar'

(a) Account for the case of *te* (l. 4), *cerebri*, and the mood of *agam*.

(b) Write a note on the general character of this satire, stating also what you regard as its purpose.

3. Translate:

Pauca licet portes argenti vascula puri
nocte iter ingressus, gladium contumque timebis
et motae ad lunam trepidabis harundinis umbram:
cantabit vacuus coram latrone viator.
prima fere vota et cunctis notissima templis
divitiae, crescant ut opes, ut maxima toto
nostra sit arca foro. Sed nulla aconita bibuntur
fictilibus: tunc illa time, cum pocula sumes
gemmata et lato Setinum ardebit in auro.

(a) What exactly is the meaning of ll. 6-9 from *ut maxima*. Write a brief note on the practice alluded to in the last three lines.

(b) Derive *fictilibus* and explain its case. Give English derivatives from the root of *fictilibus*, *ardebit*.

4. Translate:

Namque sub Oebaliae memini me turribus altis,
Qua niger umectat flaventia culta Galaesus,
Corycium vidisse senem, cui pauca relict
Iugera ruris erant, nec fertilis illa iuven
Nec pecori opportuna seges nec commoda Baccho,
Hic rarum tamen in dumis olus albaque circum
Lilia verbenasque premens vescumque papaver,
Regum aequabat opes animis, seraque revertens
Nocte domum dapibus mensas onerabat inemptis.
Primus vere rosam atque autumn
Et cum tristis hiemps etiamnum frigore saxa
Rumperet et glacie cursus frenaret aquarum,
Ille comam mollis iam tondebat hyacinthi
Aestatem increpitans seram zephyrosque morantes.

(a) What is the syntax of *iuven*, *carpere*? What connection has this extract with the subject of the book?

(b) Illustrate from this book the poet's feeling of the *beauty and dignity of labor*.

EITHER B.

5. Translate:

Exim diversi ordiuntur, hic magnitudinem Romanam, opes Caesaris et victis graves poenas, in deditionem venienti paratam clementiam; neque coniugem et filium eius hostiliter haberi: ille fas patriae, libertatem avitam, penetralis Germaniae deos, matrem precum sociam; ne propinquorum et adfinium denique gentis suae desertor et proditor quam imperator esse mallet. paulatim inde ad iurgia prolapsi quo minus pugnam consererent ne flumine quidem interiecto cohibebantur, ni Stertinius adcurrrens plenum irae armaque et equum poscentem Flavum adtinuisset.

(a) Account for the case of *matrem*, *precum*, and the mood and tense of *cohibebantur*.

(b) Parse *victis*, *mallet*.

6. Translate:

Contra Gallus Asinius disseruit: auctu imperii adolevisse etiam privatas opes, idque non novum, sed e vetustissimis moribus; aliam apud Fabricios, aliam apud Scipiones pecuniam; et cuncta ad rem publicam referri, qua tenui angustas civium domos, postquam eo magnificentiae venerit, gliscere singulos. neque in familia et argento quaeque ad usum parentur nimium aliquid aut modicum nisi ex fortuna possidentis.

(a) Explain the case of *qua* (*tenui*), *magnificentiae*, the mood and tense of *venerit*, *parentur*, and the reference in *Fabricios*. Parse *possidentis*.

7. Translate:

Funus sine imaginibus et pompa per laudes ac memoriam virtutum eius celebre fuit. et erant qui formam, aetatem, genus mortis, ob propinquitatem etiam locorum, in quibus interiit, magni Alexandri fati adaequarent. nam utrumque corpore decoro, genere insigni, haud multum triginta annos egressum, suorum insidiis externas inter gentes occidisse: sed hunc mitem erga amicos, modicum voluptatum, uno matrimonio, certis liberis egisse, neque minus proeliatorem, etiam si temeritas afuerit praepeditusque sit percussas tot victoriis Germanias servitio premere.

(a) Explain the reference in *imaginibus et pompa; suorum . . . occidisse*.

OR C.

5. Translate:

In universum tamen aestimanti Gallos vicinam insulam occupasse credibile est. eorum sacra deprehendas ac superstitionum persuasiones; sermo haud multum diversus, in deprecandis periculis eadem audacia et, ubi advenere, in detrectandis eadem formido. plus tamen ferociae Britanni praeferunt, ut quos nondum longa pax emollierit. nam Gallos quoque in bellis floruisse accepimus; mox segnitia cum otio intravit amissa virtute pariter ac libertate. quod Britannorum olim victis evenit: ceteri manent quales Galli fuerunt.

(a) Parse *deprecandis, victis*.

(b) Account for the case of *aestimanti, ferociae*, and the mood of *deprehendas*.

(c) *Sacra*. Give some account of.

6. Translate:

Nos terrarum ac libertatis extremos recessus ipse ac sinus famae in hunc diem defendit; atque omne ignotum pro magnifico est: sed nunc terminus Britanniae patet. nulla iam ultra gens, nihil nisi fluctus et saxa, et infestiores Romani, quorum superbiam frustra per obsequium ac modestiam effugeris. raptores orbis, postquam cuncta vastantibus defuere terrae, iam et mare scrutantur: si locuples hostis est, avari, si pauper, ambitiosi, quos non Oriens, non Occidens satiaverit; soli omnium opes atque inopiam pari adfectu concupiscunt. auferre trucidare rapere falsis nominibus imperium, atque ubi solitudinem faciunt, pacem appellant.'

(a) Parse *vastantibus*, and explain the syntax of *orbis*, *satiaverit*.

7. Translate:

Nec multo post illa nubes descendere in terras, operire maria: cinxerat Capreas et absconderat, Miseni quod procurrit abstulerat. tum mater orare, hortari, iubere quoquo modo fugerem: posse enim luuenem, se et annis et corpore grauem bene morituram, si mihi causa mortis non fuisset. ego contra, saluum me nisi una non futurum: dein manum eius amplexus addere gradum cogo. paret aegre incusatque se quod me moretur. iam cinis, adhuc tamen rarus: respicio; densa caligo tergis imminebat, quae nos torrentis modo infusa terrae sequebatur. 'deflectamus' inquam 'dum uidemus ne in uia strati comitantium turba in tenebris obteramur.'

(a) Explain the case of *Miseni*, and the mood of *orare*, *moretur*.

(b) Give the present infinitive and supine of *cinxerat*, *abstulerat*, *obteramur*.

(c) What and where are *Capreae* and *Misenum*?

LATIN AUTHORS (1911).

GENERAL.

Examiner—R. C. READE.

1. Translate:

Libera per vacuum posui vestigia princeps,
Non aliena meo pressi pede. Qui sibi fidit,
Dux regit examen. Parios ego primus iambos
Ostendi Latio, numeros animosque secutus
Archilochi, non res et agentia verba Lycamben.
Ac ne me foliis ideo brevioribus ornes,
Quod timui mutare modos et carminis artem;
Temperat Archilochi musam pede mascula Sappho,
Temperat Alcaeus, sed rebus et ordine dispar,
Nec socerum quaerit, quem versibus oblinat atris,
Nec sponsae laqueum famoso carmine nectit.
Hunc ego, non alio dictum prius ore, Latinus
Vulgavi fidicen; iuvat immemorata ferentem
Ingenuis oculisque legi manibusque teneri.

Explain the mood of *ornes*, *oblinat*.

To what literary achievement does Horace here make reference? How does the word 'ingenuis' add to his praise?

2. Translate:

Me quoties reficit gelidus Digentia rivus,
Quem Mandela bibit, rugosus frigore pagus,
Quid sentire putas? quid credis, amice, precari?
Sit mihi, quod nunc est, etiam minus, et mihi vivam
Quod superest aevi, si quid superesse volunt di;
Sit bona librorum et provisae frugis in annum
Copia, neu flitem dubiae spe pendulus horae!
Sed satis est orare Iovem, quae ponit et aufert:
Det vitam, det opes, aequum mi animum ipse parabo.

Where is Digentia?

How do the facts of Horace's life bear out this philosophy?

3. Translate:

Tu, quamcunque deus tibi fortunaverit horam,
Grata sume manu, neu dulcia differ in annum,
Ut, quocunque loco fueris, vixisse libenter
Te dicas: nam si ratio et prudentia curas,
Non locus effusi late maris arbiter aufert,
Coelum, non animum mutant, qui trans mare currunt.
Explain the mood of fueris, dicas.

How does this passage illustrate Horace's philosophy of life?

4. Translate:

Ut proficiscentem docui te saepe diuque,
Augusto reddes signata volumina, Vini,
Si validus, si laetus erit, si denique poscet;
Ne studio nostri pecces odiumque libellis
Sedulus importes opera vehemente minister.

What important event in Horace's life does this Epistle mark?

5. Discuss the statement that the predominant interest of the Epistles is ethical.

LATIN AUTHORS (1911).

HORACE EPISTLES—GENERAL.

Examiner—R. C. READE.

1. Translate:

Nunc ego, iudices, iam vos consulo quid mihi faciendum putetis; id enim consilii mihi profecto taciti dabit, quod egomet mihi necessario capiendum intellego: si utar ad dicendum meo legitimo tempore, mei laboris, industriae diligentiaeque capiam fructum et ex accusa-

tione perficiam ut nemo umquam post hominum memoriam paratior, vigilantior, compositior ad iudicium venisse videatur; sed in hac laude industriae meae reus ne elabatur summum periculum est. Quid est igitur quod fieri possit? Non obscurum, opinor, neque absconditum: fructum istum laudis, qui ex perpetua oratione percipi potuit, in alia tempora reservemus: nunc hominem tabulis, testibus, privatis publicisque litteris auctoritatibusque accusemus.

(a) Explain the mood of *putetis*, *elabatur*, *possit*, *accusemus*.

(b) In what way did Cicero, in his conduct of this case, depart from the usual procedure? What advantage did he gain?

2. Translate:

Quotiens ego hunc Archiam vidi, iudices,—utar enim vestra benignitate, quoniam me in hoc novo genere dicendi tam diligenter attenditis—, quotiens ego hunc vidi, cum litteram scripsisset nullam, magnum numerum optimorum versuum de eis ipsis rebus, quae tum agerentur, dicere ex tempore! Quotiens revocatum eandem rem dicere commutatis verbis atque sententiis! Quae vero accurate cogitateque scripsisset, ea sic vidi probari, ut ad veterum scriptorum laudem perveniret. Hunc ego non diligam, non admirer, non omni ratione defendendum putem? Atque sic a summis hominibus eruditissimisque accepimus, ceterarum rerum studia et doctrina et praeceptis et arte constare; poëtam natura ipsa valere et mentis viribus excitari et quasi divino quodam spiritu inflari.

(a) Explain the mood of *vidi* (line one), *perveniret*, *putem*.

(b) State briefly the circumstances which led up to this speech.

3. Translate:

(i) Impius haec tam culta novalia miles habebit,
barbarus has segetes: en quo discordia civis
produxit miseros: his nos consevimus agros!
insere nunc, Meliboeë, piros, pone ordine vitis.

(ii) Pauca tamen suberunt priscae vestigia fraudis,
quae temptare Thetim ratibus, quae cingere muris
oppida, quae iubeant telluri infindere sulcos.
alter erit tum Tiphys, et altera quae vehat Argo
delectos heroas; erunt etiam altera bella
atque iterum ad Troiam magnus mittetur Achilles.

(iii) Tu procul a patria (nec sit mihi credere tantum)

Alpinas a, dura, nives et frigora Rheni
me sine sola vides. a, te ne frigora laedant!
a, tibi ne teneras glacies secet aspera plantas!

(iv) 'Non pudet obsidione iterum valloque teneri,
bis capti Phryges, et morti praetendere muros?
en qui nostra sibi bello conubia poscunt!
quis deus Italiam, quae vos dementia adegit?
non hic Atridae nec fandi fictor Vlixes:
durum a stirpe genus natos ad flumina primum
deferimus saevoque gelu duramus et undis.
venatu invigilant pueri silvasque fatigant;
flectere ludus equos et spicula tendere cornu.
at patiens operum parvoque adsueta iuventus
aut rastris terram domat aut quatit oppida bello.

(a) Give the parts of *consevimus* in (i); explain the mood of *vehat* in (ii), *secet* in (iii).

(b) Explain *Tiphys* in (ii), 'tu' in (iii), *Atridae* in (iv).

(c) Write some description, based on the *Eclogues* read, of the nature of *Bucolic* poetry.

Or

Give a brief statement of the story of *Aeneid IX*.

4. Translate:

SI. Iubeo Chremetem... CH. O te ipsum quaerebam.

SI. Et ego te. CH. Optato advenis.

Aliquot me adierunt, ex te auditum qui aibant, hodie
filiam

Meam nubere tuo gnato: id viso tun an illi insaniant.

SI. Ausculta paucis: et quid te ego velim et tu quod
quaeris scies.

CH. Ausculto: loquere quid velis.

SI. Per te deos oro et nostram amicitiam, Chreme,

Quae incepta a parvis cum aetate adcrevit simul,

Perque unicum gnatam tuam et gnatum meum,

Quoius tibi potestas summa servandi datur,

Vt me adiuves in hac re, atque ita uti nuptiae

Fuerant futurae, fiant. CH. Ah, ne me obsecra:

Quasi hoc te orando a me inpetrare oporteat.

Alium esse censes nunc me atque olim quom dabam?

Si in remst utrique ut fiant, arcessi iube.

Sed si ex ea re plus malist quam commodi

Vtrique, id oro te in commune ut consulas,

Quasi illa tua sit Pamphilique ego sim pater.

(a) Give Ciceronian forms for 'tun', 'quoius', 'uti',
'fuerant futurae', and 'ne me obsecra'.

(b) Sketch the plot of this play sufficiently to show
wherein consists its dramatic interest.

(c) Give a character sketch of *Davus*.

LATIN PROSE.

HONOUR.

Examiner—W. S. MILNER, M.A.

Great discontents frequently arise in the best constituted governments from causes which no human wisdom can foresee, and no human power can prevent. They occur at uncertain periods which are commonly not far asunder. Governments of all kinds are administered only by men; and great mistakes, tending to inflame these discontents may occur. The indecision of those who happen to rule at the critical time, their supine neglect or their precipitate and ill-judged attention, may aggravate the public misfortunes. In such a state of things, the principles, now only sown, will shoot out and vegetate in full luxuriance. In such circumstances the minds of the people become sore and ulcerated. They are put out of humour with all public men and all public parties; they are fatigued with their dissensions; they are irritated at their coalitions; they are easily made to believe (what much pains are taken to make them believe) that all oppositions are factious, and all courtiers base and servile. From their disgust at men, they are soon led to quarrel with their frame of government, which they presume gives nourishment to the vices, real or supposed, of those who administer in it. Mistaking malignity for sagacity, they are soon led to cast off all hope from a good administration of affairs, and come to think that all reformation depends, not on the change of actors, but upon an alteration in the machinery.

CLASSICS.

LATIN SIGHT TRANSLATION.

Examiner—NORMAN W. DEWITT, PH.D.

1. Hoc tamen interest, quod volgus interdum non probandum oratorem probat, sed probat sine comparatione: cum a mediocri aut etiam a malo delectatur, eo est contentus; esse melius non sentit, illud quod est, qualecumque est, probat. Tenet enim aures vel mediocris orator, sit modo aliquid in eo; nec res ulla plus apud animos hominum quam ordo et ornatus orationis valet. Quare quis ex populo, cum Q. Scaevolam pro M. Coponio dicentem audiret in ea causa, de qua ante dixi, quicquam politius aut elegantius aut omnino melius aut expectaret aut posse fieri putaret? Cum is hoc probare vellet, M'. Curium, cum ita heres institutus esset, 'si

pupillus ante mortuus esset quam in suam tutelam venisset,' pupillo non nato heredem esse non posse: quid ille non dixit de testamentorum iure? de antiquis formulis? quem ad modum scribi oportuisset, si etiam filio non nato heres institueretur? quam captiosum esse populo, quod scriptum esset neglegi et opinione quaeri voluntates et interpretatione disertorum scripta simplicium hominum pervertere? Quam ille multa de auctoritate patris sui, qui semper ius illud esse defenderat? quam omnino multa de conservando iure civili? Quae quidem omnia cum perite et scienter tum ita breviter et presse et satis ornate et pereleganter diceret, quis esset in populo, qui aut expectaret aut fieri posse quicquam melius putaret? At vero, ut contra Crassus ab adolescente delicato, qui in litore ambulans scalmum repperisset ob eamque rem aedificare navem concupivisset, exorsus est, similiter Scaevolam ex uno scalmo captionis centumvirale iudicium hereditatis effecisse: hoc ille initio, consecutis multis eiusdem generis sententiis, delectavit animosque omnium qui aderant in hilaritatem a severitate traduxit; quod est unum ex tribus, quae dixi ab oratore effici debere, Deinde hoc voluisse eum, qui testamentum fecisset, hoc sensisse, quoquo modo filius non esset, qui in suam tutelam veniret, sive non natus sive ante mortuus, Curius heres ut esset; ita scribere plerosque et id valere et valuisse semper. Haec et multa eiusmodi dicens fidem faciebat; quod est ex tribus oratoris officiis alterum.

2. Iamque adeo super unus eram, cum limina Vestae
Servantem et tacitam secreta in sede latentem
'Tyndarida aspicio: dant clara incendia lucem
Erranti passimque oculos per cuncta ferenti.
Illa sibi infestos eversa ob Pergama Teucros
Et Danaum poenam et deserti coniugis iras
Praemetuens, Troiae et patriae communis Erinys,
Abdiderat sese atque aris invisata sedebat.
Exarsere ignes animo; subit ira cadentem
Ulcisci patriam et sceleratas sumere poenas.
'Scilicet haec Spartam incolumis patriasque Mycenae
Aspiciet, partoque ibit regina triumpho,
Coniugiumque domumque patres natosque videbit,
Iliadum turba et Phrygiis comitata ministris?
Occiderit ferro Priamus? Troia arserit igni?
Dardanium totiens sudarit sanguine litus?
Non ita. Namque etsi nullum memorabile nomen
Feminea in poena est, nec habet victoria laudem,
Extinxisse nefas tamen et sumpsisse merentis
Laudabor poenas, animumque explesse iuvabit
Ultrix famam et cineres satiasset meorum.'

LATIN.

VIRGIL AND THE ELEGIAC POETS.

HONOUR.

Examiners— { R. C. READE, B.A.
 { W. A. KIRKWOOD, PH.D.

A.

Write in a separate book.

Translate:

Tum canit, errantem Permessi ad flumina Gallum
Aonas in montes ut duxerit una sororum;
Utque viro Phœbi chorus assurrexerit omnis;
Ut Linus hæc illi divino carmine pastor
Floribus atque apio crines ornatus amaro
Dixerit: "Hos tibi dant calamos, en, accipe, Musæ,
Ascræo quos ante seni, quibus ille solebat
Cantando rigidas deducere montibus ornos."
His tibi Gryneï nemoris dicatur origo,
Ne quis sit lucus, quo se plus jactet Apollo.

(b) Bis gravidos cogunt fetus, duo tempora messis,
Taygete simul os terris ostendit honestum
Plias, et Oceani spretos pede repulit amnes,
Aut eadem sidus fugiens ubi Piscis aquosi
Tristior hibernas cœlo descendit in undas.
Illis ira modum supra est, læsæque venenum
Morsibus inspirant, et spicula cæca relinquunt
Affixæ venis, animasque in vulnere ponunt.
Sin duram metues hiemem parcesque futuro
Contusosque animos et res miserabere fractas;
At suffire thymo, cerasque recidere inanes
Quis dubitet? nam sæpe favos ignotus adedit
Stellio, et lucifugis congesta cubilia blattis,
Immunisque sedens aliena ad pabula fucus;
Aut asper crabro imparibus se immiscuit armis,
Aut dirum tineæ genus, aut invisæ Minervæ
Laxos in foribus suspendit aranea casses.

(c) Jamque ascendebant collem, qui plurimus urbi
Imminet, adversasque aspectat desuper arces.
Miratur molem Æneas, magalia quondam;
Miratur portas, strepitumque et strata viarum.
Instant ardentes Tyrii; pars ducere muros,
Molirique arcem, et manibus subvolvere saxa,
Pars optare locum tecto, et concludere sulco.
Jura magistratusque legunt, sanctumque senatum.
Hic portus alii effodiunt; hic alta theatris
Fundamenta petunt alii, immanesque columnas
Rupibus excidunt, scenis decora alta futuris.

(d) Postquam altum tenuere rates, nec jam amplius
ullæ

Apparent terræ, cœlum undique et undique pontus,
Tum mihi cæruleus supra caput adstitit imber,
Noctem hiememque ferens, et inhorruit unda tenebris.
Continuo venti volvunt mare, magnaque surgunt
Æquora; dispersi jactamur gurgite vasto.
Involvere diem nimbi, et nox humida cœlum
Abstulit; ingeminant abruptis nubibus ignes.
Excutimur cursu, et cæcis erramus in undis.
Ipse diem noctemque negat discernere cœlo,
Nec meminisse viæ media Palinurus in unda.

(e) Tum vos, o Tyrii, stirpem et genus omne futurum
Exercete odiis; cinerique hæc mittite nostro
Munera. Nullus amor populis, nec fœdera sunt.
Exoriare aliquis nostris ex ossibus ultor,
Qui face Dardanos ferroque sequare colonos,
Nunc, olim, quocumque dabunt se tempore vires.
Litora litoribus contraria, fluctibus undas
Imprecor, arma armis; pugnent ipsique nepotesque."

1. *Gallum*. Give some account of him. Mention any other members of Virgil's literary coterie.

2. (a) Write notes on: *Permessi, Aonas, Linus, Ascraeo, Grynei*.

(b) State briefly the context of (c). What qualities of Virgil's style does it exhibit?

(c) *Sicanio* etc. Account for Virgil's interest in such geographical descriptions.

3. Scan the first two verses of (e), and point out any metrical peculiarities in the passage.

4. Discuss adequately any *two* of the following:

(a) How far does Virgil's use of models lessen his originality in Bucolic poetry?

(b) In what sense is Virgil a nature poet?

(c) Trace Virgil's development as a poet. Has he one style or many styles? In what sense is there a "Virgilian manner"?

(d) "Where Aeneas is brought into relation with Dido and Turnus Virgil has allowed the ethical interest to supersede the poetical." Explain.

(e) Does the expression "Pius Aeneas" in any way demonstrate the unity of the Aeneid?

(f) What was the amount and nature of Virgil's indebtedness to Homer?

B.

Write in a separate book.

1. Translate:

ut succensa sacris crepitat bene laurea flammis,
omine quo felix et sacer annus erit!
laurus ubi bona signa dedit, gaudete coloni;
distendet spicis horrea plena Ceres,
oblitus et musto feriet pede rusticus uvas,
dolia dum magni deficientque lacus.
ac madidus baccho sua festa Palilia pastor
concinet: a stabulis tunc procul este, lupi.
ille leuis stipulæ sollemnis potus aceruos
accendet, flammam transilietque sacras.

Explain *Palilia*, and the force of *sua* (v. 7).

In the above extract note whatever you think is characteristic of the writer in subject, diction and versification.

2. Translate:

bella satis cecini: citharam iam poscit Apollo
uictor et ad placidos exiit arma choros.
candida nunc molli subeant conuiuia luco,
blanditiaequae fluant per mea colla rosae,
uinaque fundantur prelis elisa Falernis,
terque lauet nostras spica Cilissa comas.
ingenium potis irritet Musa poetis:
Bacche, soles Phoebos fertilis esse tuo.
ille paludosos memoret seruire Sugambros:
Cepheam hic Meroen fuscaque regna canat,
hic referat sero confessum foedere Parthum:
'reddat signa Remi, mox dabit ipse sua:
siue aliquid pharetris Augustus parcet Eois,
differat in pueros ista tropaea suos.
gaude, Crasse, nigras si quid sapis inter harenas:
ire per Euphraten ad tua busta licet.'
sic noctem patera, sic ducam carmine, donec
iniciat radios in mea uina dies.

bella satis cecini—to what does the poet refer?

Explain the references in *Sugambros*, *Cepheam*, *Meroen*, *Remi*, *pueros* (vv. 9-14).

3. Scan the last two verses of 2, and describe the structure of the elegiac couplet. What was the part played by Tibullus and Propertius in the history of elegiac poetry?

4. "No two poets could be more strongly contrasted than Tibullus and Propertius, even when their subject and manner of treatment approximate most closely." Explain briefly.

CLASSICS.

(SALLUST, CICERO'S LETTERS, CÆSAR'S CIVIL WAR.)

Examiner—W. S. MILNER, M.A.

1. Translate:

(a) Isdem temporibus M. Caelius Rufus praetor causa debitorum suscepta initio magistratus tribunal suum iuxta C. Treboni, praetoris urbani, sellam collocavit et, si quis appellavisset de aestimatione et de solutionibus quae per arbitrum fierent, ut Caesar praesens constituerat, fore auxilio pollicebatur. Sed fiebat aequitate decreti et humanitate Treboni, qui his temporibus clementer et moderate ius dicendum existimabat, ut reperiri non possent a quibus initium appellandi nasceretur. Nam fortasse inopiam excusare et calamitatem aut propriam suam aut temporum queri et difficultates auctionandi proponere etiam mediocris est animi; integras vero tenere possessiones qui se debere fateantur, cuius animi aut cuius impudentiae est? Itaque hoc qui postularet reperiebatur nemo, atque ipsis ad quorum commodum pertinebat durior inventus est Caelius; et ab hoc profectus initio, ne frustra ingressus turpem causam videretur, legem promulgavit, ut sexenni die sine usuris creditae pecuniae solvantur.

(b) A. d. vii. Id. Febr. Milo adfuit; dixit Pompeius, sive voluit: nam, ut surrexit, operae Clodianae clamorem sustulerunt, idque ei perpetua oratione contigit, non modo ut adclamatione, sed ut convitio et maledictis impediretur. Qui ut peroravit—nam in eo sane fortis fuit, non est deterritus, dixit omnia atque interdum etiam silentio, cum auctoritate † peregerat—, sed ut peroravit, surrexit, Clodius: ei tantus clamor a nostris—placuerat enim referre gratiam—, ut neque mente nec lingua neque ore consisteret. Ea res acta est, cum hora sexta vix Pompeius perorasset, usque ad horam viii., cum omnia maledicta, versus denique obscenissimi in Clodium et Clodiam dicerentur. Ille furens et exsanguis interrogabat suos in clamore ipso, quis esset, qui plebem fame necaret. Respondebant operae: 'Pompeius.' Quis Alexandriam ire cuperet. Respondebant: 'Pompeius.' Quem ire vellent. Respondebant: 'Crassum.' Is aderat tum, Miloni animo non amico. Hora fere nona quasi signo dato Clodiani nostros consputare coeperunt: exarsit dolor. Urgere illi, ut loco nos moverent; factus est a nostris impetus; fuga operarum; eiectus de rostris Clodius; ac nos quoque tum fugimus, ne quid in turba.

(b) Mihi autem amissis ornamentis iis, quae ipse commemoras quaeque eram maximis laboribus adeptus, unum manebat illud solacium, quod ereptum est. Non amicorum negotiis, non rei publicae procuratione impediabantur cogitationes meae; nihil in foro agere libebat; aspicere curiam non poteram; existimabam, id quod erat, omnes me et industriae meae fructus et fortunae perdidisse. Sed, cum cogitarem haec mihi tecum et cum quibusdam esse communia, et cum frangerem iam ipse me *et* cogere illa ferre toleranter, habebam quo confugerem, ubi conquiescerem, cuius in sermone et suavitate omnes curas doloresque deponerem: nunc autem hoc tam gravi vulnere etiam illa, quae consanuisse videbantur, recrudescunt; non enim, ut tum me a re publica maestum domus excipiebat, quae levaret, sic nunc domo maerens ad rem publicam confugere possum, ut in eius bonis acquiescam. Itaque et domo absum et foro, quod nec eum dolorem, quem e re publica capio, domus iam consolari potest nec domesticum res publica.

2. Comment on the following without translating:

(a) Erant praeterea conplures paulo occultius consili huiusce participes nobiles, quos magis dominationis spes hortabatur quam inopia aut alia recessitudo. Ceterum iuventus pleraque, sed maxime nobilium, Catilinae inceptis favebat.

(b) In se iura magistratum commutari, ne ex praetura et consulatu, ut semper, sed per paucos probati et electi in provincias mittantur.

(c) Sic triduum disputationibus excusationibusque extrahitur. Subicitur etiam L. Metellus tribunus plebis ab inimicis Caesaris, qui hanc rem distrahat reliquasque res quascumque agere instituerit impediatur. Cuius cognito consilio Caesar frustra diebus aliquot consumptis, ne reliquum tempus dimittat, infectis eis quae agere destinaverat ab urbe proficiscitur atque in ulteriorem Galliam pervenit.

(d) Romanae autem se res sic habent: senatus **Ἀπειος πάγος*. Nihil constantius, nihil severius nihil fortius: nam cum dies venisset rogationi ex senatus consulto ferendae, concursabant barbatuli iuvenes, totus ille grex Catilinae, duce filiola Curionis, et populum, ut antiquaret, rogabant; Piso autem consul, lator rogationis, idem erat dissuasor. Operae Clodianae pontes occupant; tabellae ministrabantur ita, ut nulla daretur

VTI ROGAS. Hic tibi rostra Cato advolat, convitium Pisoni consuli mirificum facit, si id est convitium, vox plena gravitatis, plena auctoritatis, plena denique salutis.

(e) Gnaeus quidem noster iam plane quid cogitet nescio:

φυσᾶ γὰρ οὐ μικροῖσιν ἀλλίσκοις ἔτι,
ἀλλ' ἀγρίαις φύσαισι, φορβείας ἄτερ.

qui quidem etiam istuc adduci potuerit. Nam adhuc haec ἐσοφίζετο, se leges Caesaris probare, actiones ipsum praestare debere; agrariam legem sibi placuisse, potuerit intercedi necne, nihil ad se pertinere; de rege Alexandrino placuisse sibi aliquando confici; Bibulus de caelo tum servasset necne, sibi quaerendum non fuisse; de publicanis, voluisse se illi ordini commodare; quid futurum fuerit, si Bibulus tum in forum descendisset, se divinare non potuisse.

(f) Dicerem, quae ante futura dixissem, ni vererer ne ex eventis fingere viderer; sed tamen plurimi sunt testes me et initio, ne coniungeret se cum Caesare, monuisse Pompeium, et postea, ne se diiungeret: coniunctione frangi senatus opes, diiunctione civile bellum excitari videbam.

(g) Populo vero nihil fortius, nihil melius, Italiaque universa; nihil autem foedius Philippo et Pisone legatis, nihil flagitiosius; qui cum essent missi, ut Antonio ex senatus sententia certas res denuntiarent, cum ille earum rerum nulli paruisset, ultro ab illo ad nos intolerabilia postulata rettulerunt.

L A T I N .

(TACITUS' ANNALS AND PRINCIPATE).

HONOUR.

Examiner—J. FLETCHER, M.A.

Translate:

Ego me, Patres Conscripti, mortalem esse et hominum officia fungi, satisque habere si locum principem impleam, et vos testor et meminisse posteros volo; qui satis superque memoriae meae tribuent, ut majoribus meis dignum, rerum vestrarum providum, constantem in periculis, offensionum pro utilitate publica non pavidum

credant. Hæc mihi in animis vestris templa, hæ pulcherrimæ effigies et mansuræ. Nam quæ saxo struuntur, si iudicium posterorum in odium vertit, pro sepulchris spernuntur. Proinde socios, cives, et deos ipsos precor; hos, ut mihi ad finem usque vitæ quietam et intelligentem humani divinique juris mentem duint, illos, ut, quandoque concessero, cum laude et bonis recordationibus facta atque famam nominis mei prosequantur." Perstititque posthac secretis etiam sermonibus aspernari talem sui cultum. Quod alii modestiam, multi, quia diffideret, quidam ut degeneris animi, interpretabantur. Optimos quippe mortalium altissima cupere: sic Herculem et Liberum apud Græcos, Quirinum apud nos, deum numero additos. Melius Augustum, qui speraverit. Cetera principibus statim adesse; unum insatiabiliter parandum, prosperam sui memoriam; nam contemptu famæ contemni virtutes.

(b) Irritatusque suppliciis cunctos, qui carcere attingebantur accusati societatis cum Sejano, necari jubet. Jacuit immensa strages, omnis sexus, omnis ætas; illustres, ignobiles; dispersi aut aggerati. Neque propinquis aut amicis assistere, illacrimare, ne visere quidem diutius, dabatur; sed circumjecti custodes et in mærorem cujusque intenti corpora putrefacta assectabantur, dum in Tiberim traherentur, ubi fluitantia aut ripis appulsa non cremare quisquam, non contingere. Interciderat sortis humanæ commercium vi metus; quantumque sævitia glisceret, miseratio arcebatur.

1. *Talem sui cultum.* Explain. Give a short account of the introduction of 'Caesar worship' at Rome.

2. Write grammatical notes on: *Officia fungi, duint,* and the case of *sortis*.

3. *Degeneris animi.* How far is this insinuation just to Tiberius?

4. Write notes on the following: *Confarratio, ars Chaldaeorum, versura, vis publica, nominatio.*

5. Comment upon the following:

(a) Mox ubi decreto patrum fasces et jus prætoris invaserit, cæsis Hirtio et Pansa, (sive hostis illos, seu Pansam venenum vulneri adfusum, sui milites Hirtium et machinator doli Cæsar abstulerat), utriusque copias occupavisse.

(b) Statim corripit reum, adit consules, cognitionem senatus poscit.

(c) Alio latere, ne Cirtensium pagi impune traherentur, propriam manum Blæsus filius duxit.

(d) At frumenta et pecuniæ vectigales, cetera publicorum fructuum, societatibus equitum Romanorum agitabantur.

(e) Ferebant periti cælestium, iis motibus siderum excessisse Roma Tiberium ut reditus illi negaretur.

(f) Sane vetus urbi fenebre malum, et seditio-
nariumque creberrima causa; eoque cohibebatur
antiquis quoque et minus corruptis moribus.

(g) Postremo in scelera simul ac dedecora prorupit,
postquam, remoto pudore et metu, suo tantum ingenio
utebatur.

(h) Pecuniam pro agris, quos in consulatu meo quarto
et postea consulibus M. Crasso et Cn Lentulo augure
adsignavi militibus, solvi municipis. Ea summa ses-
tertium circiter sexsiens milliens fuit.

(i) In consulatu sexto et septimo, bella ubi civilia
exstinxeram per consensum universorum potitus rerum
omnium, rem publicam ex mea potestate in senatus
populique Romani arbitrium transtuli. Post id tempus
praestiti omnibus dignitate, potestatis autem nihilo
amplius habui quam qui fuerunt mihi quoque in magis-
tratu conlegae.

6. Write short papers on any three of the following:

(a) The Religion of Numa under Augustus and Tiberius.

(b) The armies of the Empire, and the conditions of military service.

(c) Tacitus' achievement as a scene-painter in words.

(d) The career of Sejanus and its significance.

(e) Luxus.

(f) The government of the unarmed provinces.

(g) Was Tacitus' quarrel with the Principate, or with the character of Tiberius, or both?

ROMAN HISTORY AND INSTITUTIONS.

HONOUR.

Examiner—W. S. MILNER, M.A.

N.B.—Candidates are advised to confine themselves to six questions.

1. Develop Sallust's sketch of party-warfare in Rome from Pompey's first consulship to the year of Catiline's conspiracy.

2. "Nam postquam res publica in paucorum potentium ius atque dicionem concessit, semper illis reges, tetrarchae vectigales esse, populi nationes stipendia pendere; ceteri omnes, strenui boni nobiles atque ignobiles volgus fuimus, sine gratia, sine auctoritate."

How far does this passage contain the motive of the conspiracy? From what period would you trace the manifest shrinking of the constitution into outright oligarchy?

3. The Egyptian affair.

4. Compare the political ideal of Cicero with the polity of Augustus.

5. How far do Cicero's letters bear out Sallust's verdict upon the character of provincial government in the last century of the Republic?

6. Describe the manner in which individuals, classes and the provinces ranged themselves on either side in the Civil War.

7. Give illustrations of tribunician activity from 70 to the Civil War.

8. The conception of *imperium*.

9. The "problem of the unemployed" and its reaction on politics.

10. Caesar's first campaign in Spain, or the campaign at Dyrrhachium.

HEBREW.

GENERAL.

Examiner—T. EAKIN, M.A., Ph.D.

1. Translate:

Psalm 8: 1-6.

Write explanatory notes on למנצח, הגתית, and מזמור לרוד (v. 1).

Parse תנה (v. 2), יסדת (v. 3), כוננתה (v. 4).

Explain verse 3, and מעט מאלהים (v. 6).

2. Translate:

Psalm 22: 26-31.

Parse יראין (v. 26) and נולד (v. 32).

Explain the force of the tenses in אכלו וישתחוו (v. 30) and the use of ן in וישבו (v. 28).

Make an emendation in v. 29 which would better accord with general syntactical usage.

3. Translate:

Psalm 51: 16-21.

Parse ואתנה (v. 18), היטיבה (v. 20).

Explain vv. 20 and 21 with reference to the date of this Psalm.

4. Translate:

Psalm 77: 1-5.

Explain לאסף (v. 1).

Parse and explain the pointing of והאזין (v. 2) and ואהמיה (v. 4).

5. Translate:

Psalm 104: 5-10.

Parse תמוט (v. 5), ינוסון (v. 7), ישקו (v. 11).

Write the construct pl. of הרים (v. 6) and the absolute pl. of קול (v. 7).

Parse מקום זה (v. 8) and חיתו שדי (v. 11) explaining any peculiarity which you may find in form or syntax.

6. Insert vowel points in the following:

הדרו ליהוה כ־י־מוב כי לעולם הסדרו
יאמרי גאולי יהוה אשר גאלם מיד־צר
תעו במדבר דרך עיר מישב לא מצאו
רעבים גם־צמאים נפשם בהם תתעטף
ויצעקו אל־יהוה בצר להם והוא יצילם

7. Indicate the various kinds of parallelism found in the Psalms.

HEBREW COMPOSITION AND HISTORY.

GENERAL.

Examiner—J. F. McLAUGHLIN.

1. Translate into Hebrew:

(1) Pray for (ask) the peace of Jerusalem.

(2) I shall not die but live and tell the works of Jehovah.

(3) Wise are they to do evil, but to do good they have no knowledge.

(4) Cast me not away from Thy presence and take not Thy holy spirit from me.

(5) The earth is full of the kindness of the Lord.

(6) Blessed be His glorious name for ever, and let the whole earth be filled with His glory.

(7) Jehovah will take the children of Israel from among the nations, whither they be gone, and will gather them on every side, and bring them into their own land, and He will make them one nation in the land, upon the mountains of Israel, and one king shall be king to them all, and they shall be no more two nations, neither shall they be divided into two kingdoms any more at all.

2. Give a brief account of the uses of (1) the infinitive absolute, and (2) the accusative, with examples, in each case.

3. Give an account of the career of Cyrus and of the events which led to the Jewish restoration.

4. What great service was rendered to the Jews by Ezra and by Nehemiah, respectively? Give dates.

5. Give an account of Jewish social and political conditions in the century following the conquest by Alexander.

HEBREW TEXTS.

ORIENTAL LANGUAGES.

Examiner—J. F. McLAUGHLIN, Ph.D.

1. Translate Job 4: 2-9, noting textual emendations and indicating the metrical form.

2. Parse מלין (v. 2), יובל (v. 2), יקימון, כרעות (v. 4), ותלא (v. 5), זכר-נא (v. 7), explaining the form in each case.

3. Translate Job 7: 6-10.
4. Parse קלו (v. 6), ראי (v. 8), יכירנו (v. 10).
5. Give a synopsis of the argument of Eliphaz and of Job's reply.
6. Translate Job 10: 3-8. Note proposed emendations of the text in the last clauses of vv. 7 and 8, respectively.
7. Decline כף, עצת (v. 3), עיני (v. 4), ימי (v. 5), יד (v. 7).
8. Translate Job 14: 7-12.
9. Parse יערו (v. 12). Inflect מות in Kāl perfect, infinitive and participle, יבש in Kāl imperfect and קום in Hiph'il perfect.
10. How is the argument of Zophar (chap. 11) answered by Job, and what light is thrown upon his problem in this last speech of the first cycle?

HEBREW PROSE COMPOSITION.

HONOUR.

Examiner—T. EAKIN M.A., PH.D.

1. How majestic art Thou O God! Thy glory is too wonderful for frail man to comprehend, Thou givest light to the world, setting the sun in the heavens, Thou also satisfiest the desire of every living thing, when thy servants are bowed down Thou liftest them up, and when they wander from the paths of righteousness Thou dost restore them. Thou comfortest those in affliction, and givest wisdom to those who walk uprightly, If I should count up all Thy mercies they would be more in number than the sand of the sea, O that men would praise Thee for Thy goodness and for Thy wonderful works to the children of men.

2. In the days of Elisha the prophet there was war in Israel, and the Syrians had gone out by companies and had carried away captive a little maid, and she waited on the wife of the captain of the host, but he was smitten with a grievous sickness and was about to die, when the maid brought word to her mistress that a great prophet lived in Israel who could heal her husband. I am sure, said she, that if my master were now in Israel he could be healed, therefore I pray thee, send him in order that the hand of Jehovah may be upon him for good.

3. And the apostle stood up and beckoning with his hand said, men of Israel, and ye that fear God, hear me. The God of this people of Israel chose our fathers and exalted the people when they dwelt as sojourners in the land of strangers, and with an outstretched arm He brought them out of it, and He sustained them forty years in the wilderness and when He had destroyed seven nations in the land of Canaan He divided their land to them by lot, and after that He gave unto them judges to judge them for four hundred and fifty years until the time of Samuel the prophet.

HEBREW SIGHT TRANSLATION.

(ORIENTAL LANGUAGES.)

Examiner—W. A. POTTER, B.A., B.D.

1. Psalm 27.
2. Psalm 94:1-15
3. Prov. 12:1-10
4. Job 26:1-11

HEBREW HISTORY.

HONOUR.

Examiner—T. EAKIN, M.A., Ph.D.

(Six questions only to be answered, a choice is given between questions 5 and 6.)

1. Discuss the effects of the exile on the Jews in relation to :
 - (1) thought,
 - (2) literary activity,
 - (3) religious institutions,
 - (4) relation to other peoples.
2. Indicate the condition of the Jews in Palestine between 538 and 460 B.C., illustrating by Haggai, Zechariah and Malachi.
3. Discuss the view that Nehemiah preceded Ezra in Jerusalem. State and substantiate your own view.

4. Account for the rise of the Pharisaic and Sadduceean parties, pointing out the differences between them.

5. What were the forces that promoted Hellenistic influence among the Alexandrian Jews? Point out some instances of that influence on Jewish thought.

6. Outline the conditions under which the Romans gained possession of Palestine.

7. Write notes on :

Antiochus the Great.

Essenes.

Archelaus.

Agrippa I.

Agrippa II.

ENGLISH.

GENERAL.

Examiner—D. R. KEYS, M.A.

NOTE:—Only 5 questions to be taken of which 6 and 7 must be two. Candidates' opinions to be supported by quotations as specific references.

1. "All the Lake Poets were experimenters in metre as in matter." Illustrate from the poems of Wordsworth and Coleridge.

2. Compare Shelley, Matthew Arnold and Tennyson with special reference to their treatment of nature.

3. To what extent may politics be said to have influenced the poetry of the first half of the nineteenth century?

4. Compare Wordsworth, Keats and Morris as to their method of treating classical subjects; illustrating from *Laodamia*, *Ode on a Grecian Urn*, *Atalanta's Race*.

5. Contrast Scott and Byron as representatives of the romantic movement.

6. To what extent is the scientific spirit of the age reflected in the poetry of Wordsworth and Browning?

7. Write a brief criticism of any *two* of the following poems, pointing out the special characteristics of the author : *Ode on the Intimations of Immortality*, *The Scholar Gypsy*, *Adonais*, *My Last Duchess*, *The Blessed Damosel*.

8. Localize seven of the following passages, explaining what is obscure in them and showing their bearing upon the context:

(a) Not once beat "Praise be thine.
I see the whole design,
I, who saw power, see now Love perfect too."

(b) O for a beaker full of the warm South,
Full of the true, the blushful Hippocrene,
With beaded bubbles winking at the brim,
And purple-stained mouth.

(c) Who made them weak, meant weakness He might vex.
Had He meant other while His hand was in,
Why not make horny eyes no thorn could prick,
Or plate my scalp with bone against the snow?

(d) Dear Child, dear Girl that walkest with me here,
If thou appear untouched by solemn thought,
Thy nature is not therefore less divine:
Thou liest in Abraham's bosom all the year;
And worship'st at the Temple's inner shrine,
God being with thee when we know it not.

(e) But oh, each visitation
Suspends what nature gave me at my birth,
My shaping spirit of Imagination.
For not to think of what I needs must feel,
But to be still and patient, all I can;
And haply by abstruse research to steal
From my own nature all the natural man—
This was my sole resource, my only plan.

(f) He is made one with nature; there is heard
His voice in all her music, from the moan
Of thunder to the song of night's sweet bird;
He is a presence to be felt and known
In darkness and in light.

(g) Not for these I raise
The song of thanks and praise;
But for those obstinate questionings
Of sense and outward things,
Fallings from us, vanishings;
Blank misgivings of a Creature
Moving about in worlds not realised.

(h) I've an hypothesis—'tis quite my own;
I never let it out till now, for fear
Of doing people harm about the throne,
And injuring some minister or peer,
On whom the stigma might perhaps be blown.

(i) Out of her secret Paradise she sped,
Through camps and cities rough with stone and steel,
And human hearts, which to her airy tread
Yielding not, wounded the invisible
Palms of her tender feet where'er they fell;
And barbed tongues and thoughts more sharp than they
Rent the swift Form they never could repel,
Whose sacred blood like the young tears of May,
Paved with eternal flowers that undeserving way.

(j) The One remains, the many change and pass.

ENGLISH.

HONOUR.

Examiner—G. S. STEVENSON, M.A., B.LITT.

1. Write a short essay on *one* of the following subjects giving attention to form as well as to matter:

- (i) Browning's 'Saul.'
- (ii) The prescribed lyrics from Shelley.
- (iii) Byron's 'Vision of Judgment.'

2. Compare Scott, Keats and Morris as narrative poets. Illustrate from 'Marmion,' 'The Eve of St. Agnes,' and 'Atalanta's Race.'

3. "No poet ever drew from simpler sources than Wordsworth, but none ever made so much out of so little." Support this statement by an examination of 'Resolution and Independence,' 'I wandered lonely as a cloud,' 'The Primrose of the Rock,' 'To a Skylark,' 'To the Cuckoo.'

4. *One only of the following questions to be attempted:*

(i) Define Rossetti's place in the development of English poetry and illustrate some of his poetic characteristics from the prescribed selections.

(ii) What phases of the Romantic movement do you find illustrated in Coleridge's poetry?

(iii) Discuss and illustrate the qualities of Arnold's poetic style.

ENGLISH.

(ENGLISH AND HISTORY).

Examiner—PELHAM EDGAR, PH.D.

Note:—Three questions are to be answered, including question 1.

1. Write notes on the stylistic qualities in the writings of Carlyle, Newman, Mill, Ruskin and Arnold.

2. Compare Carlyle and Mill in their social and political views.

Or

Compare Ruskin and Arnold in the same respect.

3. Review the main heads of Newman's argument in the "Apologia," making comment where necessary.

4. (a) What claims does Arnold make for Culture?

(b) Compare and contrast with Newman's views on Culture.

(c) Criticise Arnold's sub-division of Society into Barbarian, Philistine and Populace.

5. Discuss the main tendencies in English fiction in the XIX century. Give special attention to the work of one novelist.

SHAKESPEARE.

HONOUR.

Examiner—W. H. CLAWSON, PH.D.

1. What are the sources of *King Lear*? Point out Shakespeare's method of uniting the underplot to the main story and discuss the purpose and effect of this under-plot. Account for Shakespeare's introduction of the hanging of Cordelia at the end of the play.

2. By a detailed account of the scene in which Iago first accuses Desdemona to Othello illustrate Shakespeare's power of characterization.

3. How far do the scenes before Antony's departure from Egypt reveal the character of Antony and of Cleopatra and give expression to the conflict which is the theme of the play?

4. Write an account of the distinguishing characteristics of *The Tempest* among Shakespeare's dramas and point out its special excellences.

5. Compare and contrast Shakespeare's handling of the populace in *Julius Caesar* and in *Coriolanus*.

Or

Describe the character of Philip Faulconbridge and explain his function in the play of *King John*.

6. Locate carefully and explain where necessary *any six* of the following passages:

(a) Now he'll outstare the lightning. To be furious
Is to be frightened out of fear, and in that mood
The dove will peck the estridge; and I see still,
A diminution in our captain's brain
Restores his heart; when valour preys on reason,
It eats the sword it fights with.

(b) When we were boys,
Who would believe that there were mountaineers
Dew-lapp'd like bulls, whose throats had hanging at
'em
Wallets of flesh? or that there were such men
Whose heads stood in their breasts? which now we find
Each putter-out of five for one will bring us
Good warrant of.

(c) But, alas, to make me
A fixed figure for the time of scorn
To point his slow, unmoving finger at!
Yet could I bear that too; well, very well;
But there where I have garner'd up my heart,
Where either I must live or bear no life,
The fountain from the which my current runs
Or else dries up—to be discarded thence!

(d) Such smiling rogues as these,
Like rats, oft bite the holy cords a-twain
Which are too intrinse t'unloose; smooth every passion
That in the natures of their lords rebel,
Being oil to fire, snow to the colder moods;
Renege, affirm, and turn their halcyon beaks
With every gale and vary of their masters.

(e) O, reason not the need; our basest beggars
Are in the poorest thing superfluous.
Allow not nature more than nature needs,
Man's life is cheap as beast's. Thou art a lady;
If only to go warm were gorgeous.
Why, nature needs not what thou gorgeous wear'st
Which scarcely keeps thee warm.

(f) You have been a boggler ever;
But when we in our viciousness grow hard—
O misery on't—the wise gods seel our eyes,
In our own filth drop our clear judgments; make us
Adore our errors, laugh at's while we strut
To our confusion.

(g) He being thus lorded,
Not only with what my revenue yielded,
But what my power might else exact—like one
Who having unto truth, by telling of it,
Made such a sinner of his memory,
To credit his own lie—he did believe
He was indeed the duke, out of th' substitution,
And executing the outward face of royalty,
With all prerogative.

(h) Virtue! a fig! 'tis in ourselves that we are thus or thus. Our bodies are our gardens, to the which our wills are gardeners; so that if we will plant nettles, or sow lettuce, set hyssop and weed up thyme, supply it with one gender of herbs or distract it with many, either to have it sterile with idleness or manured with industry, why, the power and corrigible authority of this lies in our wills.

ENGLISH I.

HONOUR.

Examiner—MALCOLM W. WALLACE.

Candidates will write on six questions only.

1. (a) How far is Utopia not a phantasy but a commentary on the social, political, and religious problems which faced Europe at the beginning of the Renaissance?

(b) Define the attitude of the Utopians with regard to war and to education.

2. (a) Outline the substance and write a brief note on the style of Latimer's first sermon before Edward VI.

(b) State briefly Ascham's importance as a writer of prose and as an educational reformer.

3. Sketch very briefly the plot of *Euphues*, showing in what respects it differs from and in what respects it resembles the modern novel.

4. Comment on Froude's statement that Hakluyt's *Voyages* are the prose epic of the English nation.

5. Write notes on the prose styles of Nash, Dekker, and Bacon in his Essays.

6. Give the argument of Bacon's essays on Love, of Wisdom for a Man's Self, Of Youth and Age.

7. Estimate the validity of Hooker's claim to be ranked among great Englishmen.

OLD ENGLISH TEXTS.

HONOUR.

Examiner—L. E. HORNING.

1. Translate:

Understandað ēac georne þæt dēofol þās þēode nū fela gēara dwelode tō swyðe, and þæt lýtle getrýwða wæron mid mannum, þeah hī wel spæcan; and unrihta tō fela ricsode on lande, and næs ā fela manna þe smēade ymbe þā bōte swā georne swā man scolde; ac dægdwāmlice man ihte yfel æfter oþrum, and unriht rærde and unlaga manege ealles tō wīde gynd ealle þās þēode. And wē ēac for þām habbað fela byrsta and bismra gebiden; and gyf wē ænigne bōte gebīdan sculan, þonne mōte wē þæs tō Gode earnian bet þonne wē ær þison dydon. For þām mid miclan earnungan wē geearnodon þā yrmða þe ūs on sittað, and mid swyðe miclan earnungan wē þā bōte mōtan æt Gode geræcan, gyf hit sceal heonan forð gōdiende wurðan. Lā hwæt wē witan ful georne þæt tō myclan bryce wæter unlytel, gif man þæt fyr sceal to āhte ācwæncan. And mycel is nýdþearf ac manna gehwylcum þæt hē Godes lage gýme heonan forð georne bet þonne hē ær dyde, and Godes gerihta mid rihte gelæste.

2. Explain the forms dwelode, spæcan, mōte, miclan, āhte.

3. "Half-poetical language!" What support for this statement do you find in the extract?

4. Translate:

Geþenc nū se mæra	maga Healfdenes,
snottra fengel	nū ic eōm sīþes fūs,
goldwine gumena	hwæt wē gēo spræcon:
gif ic æt þearfe	þinre scolde
5 aldre linnan,	þæt þū mē ā wære

- | | |
|---------------------|--------------------|
| forðgewitenum | on fæder stæle ; |
| wes þū mundbora | minum magoþegnum, |
| hondgesellum | gif mec hild nime. |
| Swylce ðū ðā mādmā, | þe þū mē sealdest, |
- 10 Hrōðgār lēofa, Higelāce onsend.
Mæg þonne on þæm golde ongitan Gēata dryhten,
gesēon sunu Hrēðles þonne hē on þæt sinc starað,
þæt ic gumcystum gōdne funde
bēaga bryttan, brēac þonne mōste.
- 15 And þū Unferð læt ealde lāfe,
wrættlic wægsweord wīdcūðne mann,
heardecg habban; ic mē mid Hruntinge
dōm gewyrce oþþe mec dēað nimeð.

5. Scan lines 3, 6, 11, 12, 16.

6. Explain the form and case of forðgewitenum, fæder, (6).

7. Derive mundbora, gumcystum, wægsweord, heard-ecg.

8. Translate:

Rōd wæs ic āræred,	āhōf ic rīcne cyning
heofona hlaford,	hyldan niē ne dorste.
þushdrifan hī mē mid deorcan næglum,	on mē syndon þā dolg
	gesiene.
opene inwiddhlemmas;	ne dorste ic hira ænigum
	sceððan.
Bysmeredon hīe unc bütū ætgædere;	eall ic wæs mid
	blōde bestēmed,
begoten of þæs guman sīdan,	siððan hē hæfde his
	gāst onsended.

9. Nū scylun hergan hefænricæs uard,
Metudæs mæcti end his mōdgidanc,
uerc unldurfadur; suē hē uundra gihuæs,
ēci Dryctin, or āstelidæ.
Turn this into West Saxon.

10. State briefly and clearly the place in English literature of *The Wanderer*, *Phœnix*, *Dream of the Rood*, *Bēowulf*.

ENGLISH HISTORICAL GRAMMAR.

HONOUR.

Examiner--D. R. KEYS, M.A.

Candidates are to write on Section I in full and on *one question only* in each of the following sections.

I.

1. Write historical notes on seven of the following words: *bury, could, clomb, dawn, elder, forlorn, former, hers, second, shalt, taught, tithe, wert.*

2. Trace from Old to Middle English the various forms of the principal parts of: *drīfan, findan* and *healdan.*

II.

1. Trace the influence of foreign languages upon English from the earliest Anglo Saxon to the age of Chaucer.

2. Give some account of the movement for "spelling reform."

3. Explain the following terms: Semasiology, Epenthesis, R stems, Reduplication, "King's English," "Pidgin English."

III.

1. The development of English consonants from Old to Middle English.

2. English vowel sounds from Shakespeare to Tennyson.

3. Mutation (i Umlaut) in Old and Modern English.

4. The history of English Gender.

5. Adjective declensions (A.D. 900-1900).

6. Relative and Interrogative pronouns from Old to Modern English.

7. The modal verbs in Anglo Saxon.

IV.

1. Slang and its relation to standard speech.

2. The influence of democracy on language.

3. The suitability of English for a world language.

4. Compare English, French and German (or English, Latin and Greek) in respect of sentence structure.

5. The development of English syntax from Alfred to Victoria.

6. The characteristics of the Teutonic branch of languages.

7. The vocabulary of Modern English.

GERMAN AUTHORS.

GENERAL.

Examiner—A. H. YOUNG, M.A.

1. Translate:
Ebner-Eschenbach, *Lotti die Uhrmacherin*, p. 9.
Kein einziges von allen diesen Büchern to Ein weises
Buch ist eben so unergündlich wie ein großes Menschenherz.
2. Translate:
Ibid., pp. 45-46.
Am Abend sprach Feßler zu Gottfried: to Das ist so
Weiberart."
3. Give an outline of the characters of Halwig and his
wife.
4. Translate:
Schiller, *Der Graf von Habsburg*, stanza 3.
5. Tell briefly the story related by the *Sänger* in the
preceding question.
6. Translate:
Chamisso, *Das Schloss Boncourt*, stanzas 7-9.
7. Mention the names of the authors and the titles of
these two poetical extracts.
8. Translate:
Lessing, *Emilia Galotti*, Act V, Sc. 7.
Odoardo, Ich meine, du bist ruhig, mein Kind. to reißt
er dich aus unsern Armen und bringt dich zur Grimaldi.
9. Explain the situation in the scene from which this
extract is taken and the events which lead up to it.
10. Define the terms *popular epic* and *court epic*,
minnesang, *meistersang*. Give one example of the first
and second.
11. Write notes on *Walther von der Vogelweide*, *Hart-
mann von Aue*, *Luther*, *Hans Sachs*, *Logau*, *Opitz*.

GERMAN.
COMPOSITION AND SIGHT TRANSLATION.
GENERAL.

Examiner—P. REICH, PH.D.

I.

Translate:

Der betrogene Teufel.

Die Araber hatten ihr Feld bestellt,¹
Da kam der Teufel herbei in Eil'.
Er sprach: „Mir gehört die halbe Welt,
Ich will auch von eurer Ernte mein Teil.“
Die Araber aber sind Füchse von Haus,²
Sie sprachen: „Die untere Hälfte sei dein.“
Der Teufel will allezeit oben hinaus;³
„Nein,“ sprach er, „es soll die obere sein!“
Da bauten sie Rüben in einem Strich;⁴
Und als es nun an die Teilung ging,
Die Araber nahmen die Wurzeln für sich,
Der Teufel die gelben Blätter empfing.
Und als es wiederum ging ins Jahr,
Da sprach der Teufel in hellem Zorn:
„Nun will ich die untere Hälfte fürwahr!“
Da bauten die Araber Weizen und Korn.
Und als es wieder zur Teilung kam,
Die Araber nahmen den Ahrenschnitt,
Der Teufel die leeren Stoppeln nahm
Und heizte der Gölle Ofen damit.

Rückert.

¹ to sow. ² Arrant knaves, out and out. ³ oben hinaus wollen, to aim high. ⁴ “in one stroke,” i.e. continually.
⁵ “The ears (of corn) cut off,” i.e. the grain.

II.

Translate:

Goethes Audienz bei Napoleon.

Erfurt, den 2. Oktober 1808.

Ich wurde um 11 Uhr vormittags zum Kaiser bestellt.—
Ich trete bei ihm ein. Er sitzt an einem großen runden Tische
frühstückend. Zu seiner Rechten steht Talleyrand, zu seiner
Linken Daru, mit dem er sich über Kontributions-Angelegen-
heiten¹ unterhält.—Der Kaiser winkt mir heranzukommen.—

Nachdem er mich aufmerksam angeblickt, sagte er: "Vous êtes un homme." Ich verbeugte mich.—Er fragt: „Wie alt sind Sie?“—„Sechzig Jahre.“—„Sie haben sich gut erhalten. Sie haben Tragödien geschrieben?“ Ich antwortete das Notwendigste.—Hier nahm Daru das Wort und sagte, daß ich aus dem Französischen übersetzt hätte, und zwar Voltaires „Mahomed.“ Der Kaiser versetzte: „Es ist kein gutes Stück“ und legte sehr klar auseinander, wie unschicklich es sei, daß der Weltüberwinder von sich selbst eine so ungünstige Schilderung mache. Er wandte sodann das Gespräch auf den „Werther,“ den er durch und durch studiert hatte. Dann bezeichnete er eine gewisse Stelle im „Werther“ und sagte: „Warum haben Sie das gethan? Es ist nicht naturgemäß,¹“ wofür er seine Gründe vollkommen richtig auseinandersetzte. Ich antwortete mit einem Lächeln, daß ich seinen Vorwurf ganz berechtigt finde. „Allein,“ setzte ich hinzu, „es ist dem Dichter zu verzeihen, wenn er sich eines Kunstgriffes bedient, um gewisse Wirkungen hervorzubringen, die er auf einem einfachen und natürlichen Wege nicht erreichen kann.“ Der Kaiser schien damit zufrieden.

(Aus „Tag- und Jahreshefte.“)

¹ war contributions. ² according to nature.

³ stratagem, artifice.

III.

Translate:

Frederick the Great used to ask every new soldier whom he observed in his guard, how old he was, how long he had been (schon) in his service, and whether he was satisfied with his pay and with the treatment. Once a young Frenchman, who understood not a (kein) word of German, was enlisted. He learnt by heart the three answers that he was to give the king. After some days the king perceived him in the ranks and went up to (zu) him to put to him the three questions. But the king, by chance, asked first how long he had been¹ in his service. "Twenty-one years," answered the soldier. The king, amazed, asked how old he was. "One year, your Majesty," was the reply. With still greater astonishment the king cried, either the soldier or he himself was mad.² The soldier answered: "Both, your Majesty." Then the king exclaimed, this was the first time that he had been treated as a madman at the head of his army. The king then³ spoke French with him and learnt that he understood not a word of German.

¹ use the Present Subj. with schon. ² Imperf. Subj.

³ darauf.

IV.

Translate :

1. This man is unfortunate, but he hopes for better days.
2. Go to Germany, and live six months in a family where no English is spoken, and I believe you will learn it very well.
3. Three feet long, four inches, six yards of silk ; an army of ten thousand men.
4. Not knowing how to act, I asked his advice.
5. (a) You have seen your friends.
(b) The gentleman whose hat I found yesterday.
(c) May I give you some wine? Yes, give me some.
(d) Whose book is this? It is mine.
(e) Give it to him who deserves it.

GERMAN.

MIDDLE HIGH GERMAN.

HONOUR.

Examiner—G. H. NEEDLER, B.A., PH.D.

1. Translate:

Der blic gefröwet ein herze gar,
den minneclîche ein wîp an siht:
wie welt ir danne, daz dèr var,
dem ander liep von in geschiht?
der ist eht maneger freuden rîch,
sô jenes freude gar zergât.
waz ist den freuden ouch gelîch,
dâ liebez herze in triuwen stât,
in schœne, in kiusche, in reinen siten?
swelch sælic man daz hât erstriten,
ob er daz vor den fremden lobet,
sô wizzet, daz er niht entobet.

2. Compare the following words with their modern equivalents, noting changes undergone: *wîp, siht, gelîch*

3. Translate:

Der in den ôren siech von ungesühte sî,
daz ist mîn rât, der lâ den hof ze Düringen frî:
wan kumet er dar, dêswâr er wirt êrtœret.
ich hân gedrunge, unz ich niht mê dringen mac:

ein schar vert ûz, diu ander in, naht unde tac.
grôz wunder ist daz iemen dâ gehœret.

der lântgrâve ist sô gemuot,
daz er mit stolzen helden sîne habe vertuot,
der iegeslîcher wol ein kempfe wære.
mir ist sîn hôhiu fuore kunt:
und gulte ein fuoder guotes wînes tûsent pfunt,
dâ stüende och niemer ritters becher lære.

4. What were Walther's relations with the "hof ze Düringen"?

5. *wirt, dringen, vert, wære, stüende.* Give the principal parts of these verbs in Middle High German and in New High German, explaining development.

6. Translate-

Hérzeliebez frouwelîn,
got gébe dir hiute und iemer guot!
kúnde ich baz gedenken dîn,
des hæte ich willeclîchen muot.
wáz mac ich nû sagen mê
wan daz dir nieman holder ist? ôwê dâ von ist mir vil wê.

Sie verwîzent mir daz ich
sô nidere wende mînen sanc.
daz sie niht versinnent sich
waz liebe sî, des háben undánc!
sie getraf diu liebe nie,
die dâ nâch guote und nâch der schœne minnent: wê,
wie minnent die!

7. Explain as fully as you can what Walther is referring to in lines 1 and 2 of the second stanza of this poem.

8. Translate:

Von Rôme voget, von Pülle künec, lât iuch erbarmen,
daz man mich bî rîcher kunst alsus siht armen.
gerne wolte ich, möhte ez sîn, bî eigem fiure erwarmen.
zahî wie'ch danne sunge von den vogellînen,
von der heide und von den bluomen, als ich wîlent sanc!
swelch schœne wîp mir danne gæbe ir habedanc,
der lieze ich liljen unde rôsen ûz ir wângel schînen.
sus kume ich spâte und rîte fruo: gast, wê dir, wê!
sô mac der wirt wol singen von dem grüenen klê.
die nôt bedenket, milter künec, daz iuwer nôt zergê!

9. To whom was this poem addressed? Was the appeal answered?

10. Outline the life of Walther von der Vogelweide, showing how he took part in the political life of his time.

11. State briefly the distinction between Court Epic and Popular Epic in M. H. G. literature. Name the chief examples of the former.

12. Write notes on (a) the origin and spread of "umlaut" in German; (b) the plural ending *-er*; (c) doublets such as *worte-wörter*; (d) preterite-present verbs; (e) the conjugation of the verb *fragen*.

13. Define the linguistic terms: *Hochdeutsch*, *Mitteldeutsch*, *Alemannisch*, *Plattdeutsch*, *Oberdeutsch*.

GERMAN.

(GOETHE, SCHILLER, AND KLENZE).

HONOUR.

Examiner—A. H. YOUNG, M.A.

1. Translate:

Lorentz: *Goethe-Gespräche*, 21 Februar, 1827.

So viel ist aber gewiß, to
Diese drei großen Dinge möchte ich erleben, und es wäre wohl
der Mühe wert, ihnen zuliebe es noch einige fünfzig Jahre
auszuhalten.

2. What, so far as the *Conversations* reveal it, was the character of Goethe? What do they shew his views on religion, patriotism, and science to have been?

3. Give, according to the *Conversations*, his estimate of the Germans, the English, the French, Napoleon, Lord Byron, Schiller, and the Grand Duke.

4. Write an appreciation of the women in *Wallenstein's Tod*, comparing them with one another.

5. How far do fate, superstition, and free-will account for the catastrophe in the play?

6. Translate:

Wallensteins Tod, Act II, Sc. 2, Max.

Ziemt solche Sprache mir

to

Hat gleich die Seele blutend sich befreit!

7. Shew how the love interest of the play is connected with the political interest and is made to contribute to the complexity of the plot and to the dénouement.

8. NOT TO BE TRANSLATED.

Lorentz: *Goethe-Gespräche*, 14 März, 1830.

„Ein politisches Gedicht to Doch will ich nicht leugnen, daß Urndt, Körner und Rückert einiges gewirkt haben.“

Ibid.

„Aber das war nicht mein Leben und nicht meine Sache sondern die von Theodor Körner. Ihn kleiden seine Kriegslieder auch ganz vollkommen.“

Criticize these statements of Goethe's, supporting your statements by references to the poems contained in Klenze's *Deutsche Gedichte*.

9. NOT TO BE TRANSLATED.

Ibid., Sept. 24, 1827.

„Die Poeten schreiben alle, to heßt einer den andern in noch größere Unzufriedenheit hinein.“

How far is this statement applicable to Heine? Account for its being so, referring by name and quotation to poems of his contained in Klenze's *Deutsche Gedichte*. Drawing from the same source, point out other characteristics of his poetry and genius.

GERMAN.

HONOUR.

Examiner—G. H. NEEDLER, B.A., PH.D.

1. (DO NOT TRANSLATE THIS PASSAGE).

From Grillparzer's *Medea*, ll. 99 ff.

To whom are these words addressed? Explain

(a) *der dich stürmisch freite*, (b) *auf langer Überfahrt*.

(c) *Wie du die Deinen so verrät er dich!* (d) *grab ein die Zeichen deiner Tat*.

2. Who were Grillparzer's predecessors in the dramatic treatment of the story of Medea? In what particulars has he deviated from his sources, or freely invented?

3. Discuss the plot of Grillparzer's *Medea* as to its naturalness, and the inevitableness of the tragedy, outlining the characters of Medea, Jason and Kreusa, and showing how the author has apportioned guilt to each.

4. Give your estimate of Kleist as a writer of historical plays, comparing his *Prinz von Homburg* with any other historical plays you know.

5. Discuss the characters of Prinz Friedrich, Natalie, and the Kurfürst von Brandenburg in Kleist's play.

6. Write explanatory notes on the following passages. (Do not translate.)

(a) Kleist, *Prinz Friedrich von Homburg*, ll. 730 ff.

(b) *Ibid.*, ll. 1780 ff.

7. Discuss the development of the character of Paul in *Frau Sorge*.

8. Sudermann's *Frau Sorge*.

Paul aber pflegte hinterher heimlich den Schlüssel des Schuppens vom Brette zu nehmen, um mit der „schwarzen Suse“ stumme Zwiesprach zu halten. Er hatte nun einmal den Glauben, daß von ihr die Rettung käme.

Explain the reference here. In how far did the event prove Paul's belief a justifiable one?

9. Discuss Fulda's *Der Dummkopf* as to (1) construction of plot, (2) delineation of characters. Of the chief characters, point out the one you consider best, and the one least successfully drawn, giving your reasons.

10. Outline the story of Keller's *Fähnlein der sieben Aufrechten* from the time the scene is transferred to Aarau. What political or patriotic object had Keller in writing it?

11. Und ein solches Gesicht war es, das neulich in einer solchen Nacht aus der Betgangenheit wieder vor mir empor-tauchte, eine solche Stimme, die wieder zu mir sprach.

Das Gesicht gehörte einem Jungen an, einem dicken, fetten, wie man zu sagen pflegt, kugelrunden kleinen Jungen, mit dem ich ein Vierteljahr lang in Halle auf dem Pädagogium als Schüler zusammen war.

Explain this passage by briefly relating the story. Who is the author, and what do you know of him?

12. Write notes on Rosegger, Marie von Ebner-Eschenbach and Johannes Trojan. Judging by the specimens read, what are the literary characteristics of each of these three writers?

GERMAN.
TRANSLATION AT SIGHT AND HISTORY OF
LITERATURE.

HONOUR.

Examiner—A. E. LANG.

1. Translate:

TRAUMLAND.

O goldbeglänzte Bucht des Abendschweigens!
Lautloses Perlenspiel des blühenden Schaums....
Ein Friede alle Tiefen rings
und alle Höhn
voll heiligen Lichtes,
das zögernd scheidet
von stillsten Meeren.

Unnennbar tiefe Stunde!
Ein wundersames Tränenglück,
das seine Tiefen selbst nicht kennt
und nur mein Aug
mit Glanz erfüllt,
schmerzseligen Staunens übervoll,
schweigt hell in mir
und lauscht——und lauscht....

Versunken alles!—
Tag und Lärm und Welt!
O goldbeglänzte Bucht des Abendschweigens!

2. Translate:

Ich bat ihn dringend, mir dieselben nicht vorzuenthalten. „Sie wissen längst,” hub er an, „daz Ideen, die eines festen Fundaments in der Sinnenwelt entbehren, bei all ihrem übrigen Werte für mich keine Überzeugung mit sich führen, weil ich der Natur gegenüber wissen, nicht bloz vermuten und glauben will. Was nun die persönliche Fortdauer unserer Seele nach dem Tode betrifft, so ist es damit auf meinem Wege also beschaffen. Sie steht keineswegs mit den vieljährigen Beobachtungen, die ich über die Beschaffenheit unserer und aller Wesen in der Natur angestellt, in Widerspruch; im Gegenteil, sie geht sogar aus denselben mit neuer Beweiskraft hervor. Wieviel aber oder wie wenig von dieser Persönlichkeit übrigens verdient, daz es fort dauere, ist eine andere Frage und ein Punkt, den wir Gott überlassen müssen.

3. Translate:

Als Bismarck vom Schlosz her, im weissen Koller der halberstädter Kürassiere, der Wildparkstation zuschritt rannen ihm die dicken Tränen über das erhitzte Gesicht, Als Viktoria, allein, mit den Töchtern oder dem Grafen Seckendorff und einem Lakaien, im englischen Witwengewand wieder unter die Menschen trat, war ihr Auge trocken, die Haltung straff, im Blick noch der alte Wille. Die Pfeile und Schleudern des wütenden Geschickes hatte sie getragen; die Steinwürfe der Menge, die mehr als je in ihr die Fremde sah und ihr, der Engländerin, einen Teil der Schuld an Friedrichs frühem Scheiden zuwälzte, waren an dem Erz ihres Wollens wirkunglos abgeprallt. War die kleine schwarze Frau wirklich stärker als der wuchtige Riese im weissen Reiterwamms?

Vielleicht. Wer für eines groszen Reiches Schicksal die Verantwortung trägt, an jedem neuen Morgen aus neuen Möglichkeiten das Notwendige wählen, mit neuer Kunst und List das notwendige möglich machen musz, Der kann nie so stark, so unbeirrt sicher sein wie Einer, der, ohne die Last der Verantwortlichkeit mit sich zu schleppen, nach einem vorbedachten Plan handelt und, was auch geschehen mag, ans Ende der Willenslinie den Weg sucht.

4. Discuss the literary movements in Germany during the first two decades of the nineteenth century.

5. Name the chief works of Friedrich Hebbel. Point out the peculiarities of his style, and show how he influenced succeeding dramatists.

6. Write a short note on each of the following, mentioning particularly his chief works and his place in German literature, Kleist, Keller, Freytag, Storm.

7. In what respects does the modern German drama differ from the classical drama of Goethe and Schiller? Name a contemporary German dramatist and point out the nature of his dramatic productions.

FRENCH.

GENERAL.

Examiner—J. STANLEY WILL.

1. Translate into French:

Alice was not at all astonished at that; nor did she think it remarkable when she heard the rabbit (lapin, m.) say to itself, "Oh dear! I shall be too late!" (when she thought about it afterwards, it came into her mind that she ought to have been very much surprised, but, at the time, it seemed quite natural); but, when the rabbit drew a watch out of his pocket and looked at it, and then hurried across the fields, Alice did not know what to think, for she was sure that she had never before seen a rabbit with either a pocket or a watch. So, in the greatest agitation, she followed him and was just on the point of addressing him when he ran into a hole under the hedge (haie, f.).

In another moment down went Alice after the rabbit, never stopping to ask herself how she would get out again. The hole was deep but straight for some distance and Alice was very comfortable in it but it suddenly grew larger and then she found herself falling into something that resembled a deep well (puits, m)

2. Translate into English:

Il resta quelques instants rêveur au bord de la fenêtre, comme s'il voulait laisser au gouffre de flamme le temps de prendre un parti. Puis, sans se hâter, lentement, fièrement, il enjamba l'appui de la croisée, et, sans se retourner, droit, debout, ayant derrière lui l'incendie, faisant face au précipice, il se mit à descendre l'échelle en silence avec une majesté de phantôme. Ceux qui étaient sur l'échelle se précipitèrent en bas, tous les assistants tressaillirent, il se fit autour de cet homme qui arrivait d'en haut un recul d'horreur sacrée comme autour d'une vision. Lui, cependant, s'enfonçait gravement dans l'ombre qu'il avait devant lui: pendant qu'ils reculaient, il s'approchait d'eux: sa pâleur de marbre n'avait pas un pli, son regard de spectre n'avait pas un éclair: à chaque pas qu'il faisait vers ces hommes dont les yeux se fixaient sur lui dans les ténèbres, il semblait plus grand, l'échelle tremblait sous son pied, et l'on eût dit la statue du commandeur redescendant dans le sépulcre.

LA FONTAINE.

3. Tell in three or four lines the story of any three of the fables from which the following extracts are taken:

- (a) "Est-il juste qu'on meure
Au pied levé? dit-il: attendez quelque peu.
Ma femme ne veut pas que je parte sans elle.
- (b) Rendez-moi, lui dit-il, mes chansons et mon somme.
- (c) Rien n'est si dangereux qu'un ignorant ami;
- (d) Il se faut entr'aider; c'est la loi de la nature.
L'âne un jour pourtant s'en moqua:
- (e) Le jeune homme s'émeut, voyant peint un lion:
"Ah! monstre! cria-t-il; c'est toi qui me fais vivre
Dans l'ombre et dans les fers!"
- (f) Que j'ai toujours haï les pensers du vulgaire!
Qu'il me semble profane, injuste et téméraire,
Mettant de faux milieux entre la chose et lui,
Et mesurant par soi ce qu'il voit en autrui!

4. (a) Translate extract (f) of question 3.

(b) Write grammatical notes on 'pensers,' 'soi,' 'autrui' (see question 3 (f)).

5. Discuss:

(a) La Fontaine as a representative of the so-called "classical" period of French literature.

(b) His Fables from the point of view of (i) their social, (ii) their ethical, (iii) their poetic values.

(Dictation at 12 o'clock.)

FRENCH.

(RACINE. MOLIÈRE, HUGO, PAILLÉRON, COPPÉE.)

GENERAL.

Examiner—FRANCIS HAFFKINA SNOW, PH.D.

I.

Translate:

Vous veniez de mon front observer la pâleur
Pour aller dans ses bras rire de ma douleur.
Pleurante après son char vous voulez qu'on me voie;
Mais, Seigneur, en un jour ce serait trop de joie;
Et sans chercher ailleurs des titres empruntés,
Ne vous suffit-il pas de ceux que vous portez?

Du vieux père d'Hector la valeur abattue
Aux pieds de sa famille expirante à sa vue,
Tandis que dans son sein votre bras enfoncé,
Cherche un reste de sang que l'âge avait glacé;
Dans des ruisseaux de sang Troie ardente plongée;
De votre propre main Polyxène égorgée
Aux yeux de tous les Grecs indignés contre vous;
Que peut-on refuser à ces généreux coups?

II.

Translate *one* of the following passages:

(a) Pour moi, je vous avoue que j'en suis tout scandalisé. A-t-on jamais vu, dites-moi, deux peccates provinciales faire plus les renchéries que celles-là, et deux hommes traités avec plus de mépris que nous? A peine ont-elles pu se résoudre à nous faire donner des sièges. Je n'ai jamais vu tant parler à l'oreille qu'elles ont fait entre elles, tant bâiller, tant se frotter les yeux et demander tant de fois: "Quelle heure est-il?"

(b) Quelque vol de mon cœur, quelque assassinat de ma franchise. Je vois ici des yeux qui ont la mine d'être de fort mauvais garçons, de faire insulte aux libertés et de traiter une âme de Turc à More. Comment diable, d'abord qu'on les approche, ils se mettent sur leur garde meurtrière? Ah! par ma foi, je m'en défie, et je m'en vais gagner au pied, ou je veux caution bourgeoise qu'ils ne me feront point de mal.

III.

Translate:

Une marquise

Me disait l'autre jour en sortant de l'église:
—Quel est donc ce brigand qui, là-bas, nez au vent,
Se carre, l'œil au guet et la hanche en avant,
Plus délabré que Job et plus fier que Bragance,
Drapant sa gueuserie avec son arrogance,
Et qui froissant du poing sous sa manche en haillons
L'épée à lourd pommeau qui lui bat les talons,
Promène, d'une mine altière et magistrale,
Sa cape en dents de scie et ses bas en spirale?

IV.

Translate:

(a) Non, non, va! c'est bien ici que se font, défont et surfont les réputations, les situations et les élections, où, sous couleur de littérature et beaux-arts, les malins

font leur affaire: c'est ici la petite porte des ministères, l'antichambre des académies, le laboratoire du succès. . . . Ce monde-là, mon enfant, c'est un hôtel de Rambouillet en 1881. . . le monde où l'on avale sa canne dans l'antichambre et sa langue dans le salon, le monde sérieux, enfin!

(b) Le Français, vois-tu, a pour l'ennui une horreur poussée jusqu'à la vénération. Pour lui, l'ennui est un dieu terrible qui a pour culte la tenue.

(c) Ces études dont, malgré les limites étroites et la forme légère que mon genre d'auditoire m'imposait. . . on aura peut-être entrevu l'immense portée, ces études, dis-je, ont eu, en 1821, il y a tantôt soixante ans, pour initiateur. . . je vais plus loin, pour inventeur, l'homme de génie dont j'ai le pesant honneur d'être le fils.

(d) Et si l'âme est attachée au corps, c'est comme l'aile l'est à l'oiseau: pour l'élever aux cimes!

V.

Translate *one* of the following passages:

(a) Encore si l'avenir était riant pour eux,
Et s'ils étaient certains d'un lendemain heureux!
Mais ils n'ont presque pas d'espoir qui les soutienne.
L'Amérique n'est plus cette jeune Indienne,
Souriante en son île au milieu des roseaux,
Telle qu'ils l'ont rêvée autrefois, à l'école.
Pour eux, durs ouvriers du labeur agricole,
Ce qu'ils comptent trouver là-bas, c'est seulement
La forêt monstrueuse au noir tressaillement,
Où, rampant et glissant, la hideuse famille
De la nature vierge et féroce fourmille.

(b) Lorsque tout douloureux regret fut mort en elle
Et qu'elle eut bien perdu tout espoir décevant,
Résignée, elle alla chercher dans un couvent
Le calme qui prépare à la vie éternelle.
Le chapelet battant la jupe de flanelle,
Et pâle, elle venait se promener souvent,
Dans le jardin sans fleurs, bien abrité du vent,
Avec ses plants de choux et sa vigne en tonnelle.
Pourtant elle cueillit, un jour, dans ce jardin,
Une fleur exhalant un souvenir mondain,
Qui poussait là malgré la sainte obédience;
Elle la respira longtemps, puis, vers le soir,
Saintement, ayant mis en paix sa conscience,
Mourut comme s'éteint l'âme d'un encensoir.

VI.

(a) Answer under section (a) either 1, 2, 4 and 5; or, (omitting 2) 1, 3, 4, and 5.

1. By what name is known the metre used in French classical tragedy of the XVII century, and whence was this name derived?

2. Scan (i.e., marking and counting syllables, indicating stresses, pauses and uncounted syllables, if any, lines 1-4 of I.

3. Give meanings for the following words peculiar to the XVII century: *généreux*; *gloire*; *admirer*; *ennui*; *gêne*; *soins*; *voeux*; *courage*; *rigoureux*; *constance*; *déplaisirs*.

4. What is the situation depicted by excerpt I ?

5. State briefly the plot of *Andromaque* and the source from which Racine derived it.

(b) 1. What social and literary tendency is typified by at least one of the passages under II?

2. Explain how the plot of the *Précieuses ridicules* depends on the situation of II (a).

(c) 1. What personage is referred to under III (a) and what can you say by way of comment concerning him?

2. In what scene of *Ruy Blas* does this passage occur?

3. Describe generally the historical and economic situation of Spain at the time in which the action of Hugo's drama is laid.

4. Contrast briefly, with some illustration from the passages reproduced, the fundamental differences (i.e., of plot, style, mood and metre) between the classic tragedy of the XVII and the romantic drama of the early XIX century.

(d) From what poem is V (a) extracted?

2. What should you consider the distinguishing characteristic of Coppée's style? (Illustrate, if possible, from at least one of the passages reproduced).

3. What is the basic thought underlying and connecting the whole series of poems by Coppée which you have read this year?

FRENCH.

SIGHT, PROSE, OLD FRENCH AND COMPOSITION.

GENERAL.

Examiner—J. HOME CAMERON, M.A.

N. B.—Candidates for standing in French of the Teutonic group (Minor French) alone will take only I and II. All others will take everything but I.

I.

Translate into English.

La nation la plus démocratique de l'univers, poussée sur un sol vierge que n'encombraient aucune tradition, les Etats-Unis d'Amérique, a trouvé moyen de constituer, par le rigorisme des salons, des clubs et des villégiatures d'été, un noyau aristocratique qui n'est pas, comme on pourrait l'imaginer, fondé uniquement sur l'opulence, mais aussi sur l'ancienneté relative des familles, sur le rôle qu'elles ont joué depuis cent vingt-cinq ans, sur le degré d'affinement où elles sont parvenues.

En France, le milieu mondain, dont un lot de familles historiques forme l'état-major naturel, portait, il y a cinquante ans, le nom de "faubourg Saint-Germain." Par l'exode des logis luxueux vers les Champs-Élysées, il s'est répandu sur la rive droite de la Seine; par l'agrégation incessante de familles nouvelles, son effectif a beaucoup augmenté, jusqu'à représenter aujourd'hui deux mille ménages peut-être. Mais cette "société" continue de vivre comme elle vivait, lorsqu'il y avait un monarque à Versailles ou aux Tuileries et d'être ce qu'elle était naguère, c'est-à-dire la plus brillante et la plus "polie"; la "première" sans doute, puisqu'elle s'en flatte et qu'on le croit en dehors d'elle; puisque les autres la regardent et la jalouent, tandis qu'elle les dédaigne ou les ignore.

LE VICOMTE D'AVENEL.

II.

Translate into French:

King Frederick of Prussia one day saw a peasant who was singing merrily as he tilled his field beside the highway.

—"Does this field belong to you?" asked the king.

—"No sir," replied the peasant, who did not know the king; "I am not so rich; I am only a day-labourer."

—"How much do you make each day?" continued the king.

—"Two francs," replied the peasant.

—“That is not much,” said the king, “Can you live on this slender wage?”

—“Live? It is quite sufficient, and more (trans. “beyond”). Fifty centimes are for the daily family expenses; with fifty I pay old debts; I lend fifty; and the rest is for the service of God.”

—“That is an enigma which I am unable to solve,” said the king.

—“Well, I shall do it for you (trans. “in your place”). I have at home two old parents who fed me long ago, and whom I am supporting in my turn; that is what I call paying my debts. The fifty which I lend are devoted to my children, who will return them to me some day in tender care. The rest belongs to the poor and to God.”

III.

N. B.—An option is allowed between 1 and 2, between 5 and 6, and between 7 and 8; 3 and 4 are obligatory.

1. Cite cases of the dropping of the terminal consonants before the inflexional “s” of the substantives.

2. What is meant by the distinction between the so-called “living” and “dead” conjugations?

3. Give examples of striking changes in the conjugation of the present indicative which are due to the shifting of the tonic accent.

4. Trace the development of the endings of the imperfect indicative of *finir*.

5. Show the results of the combination of the Latin *ecce* with other words in the formation of pronouns and adverbs. Tabulate the complete declension of one of these pronouns.

6. Trace the morphological history of the following: *rien, nôtre, li* (pronoun), *oui, leur* (adj. and pron.).

7. Show the history of the combinations of the prepositions *de* and *en* with the definite article in the singular and plural.

8. Give an account of the so-called “vocalisation of *l*” in Old French, illustrating by examples. Assign an approximate date for this phenomenon.

9. Translate into English:

(a) En Aliscans fu molt grans la dolor
Li quens Guillaumes tient le branc de color;
Tant ot feru sor la gent paienor
Le cors ot taint de sanc et de suour.

De . xx . mille homes k'il mena en l'estor
N'ot que . xiiii .; cil n'ont point de vigor,
Navré en sont a mort tout li plusor.

Li quens Guillaumes leur a dit par amor:

“Por Dieu, signeur, le nostre créator,

“Tant com vivons, maintenons bien l'estor.

“Li cuers me dist ja n'istrans de cest jor,

“Car tout sont mort no chevalier millor

“N'oi mais crier nostre ensengne Francor,

“Mors est Bertrans, dont ai au cuer dolor,

“De mon lignage ai perdue la flor.

“Or sai je bien jou en ai le piour

“De la bataille; mais par saint Sauvéor,

“Tant com je vive, n'aront paien sejour;

“Ja n'en auront honte mi ancisor”

(b) Or dit li livres que puis que Perceval se despartit dou tref, qu'il chevaucha, toute jor, plain de grant pensée et pria notre seigneur qui li envoiast vrei conseil de ce que il avoit entrepris et li envoiast la nuit meillor ostel que il n'avoit eu la nuit devant. Lors guarda par devant lui, si vit apparoir . I . pomeau d'une tor qui moult li samblot bele et grosse; et quant Perceval la vit si en ot grant joie et se torna cele part grant aléure. Et quant il vint là, si vit que ce estoit li plus biaux chasteaux del monde, et vit le pont abeissié et la porte deffermé et il entre enz, et tantost ferma la porte après lui mesmes. Si s'emeveilla moult et vint au perron devant la sale et atacha son cheval a . I . anel et puis monta en la sale; mais il ne trova home ne fame: lors passa, si vit une chambre et l'ovri et ne trova nulli. Quant Perceval ce vit, si s'en merveilla moult et dit: “Par Deu! merveilles voie que ceste sale est si bein joinchiée novelement, qu'il n'a pas lonc tens que il i ot gent.”

V.

Write a composition in French on one of the following subjects:

1. L'ennui.
2. Un vieil arbre raconte ses souvenirs.
3. Le règne de Louis XVIII.
4. La France de nos jours.
5. Une lettre de Victor Hugo à un ami.

FRENCH.

(AUGIER, DAUDET, SAINTE-BEUVE, LECONTE DE LISLE.)

HONOUR.

Examiner—R. E. L. KITTREDGE, M.A.

I.

1. Translate into English:

GRANDIN.

Je dois être honteux, madame, et je le suis;
Mais ce maudit complot trouble toutes mes nuits.

LA DUCHESSE.

Pourquoi donc vous en mettre?

GRANDIN.

Hélas! vous pouvez croire
Que je n'y suis entré, madame, qu'après boire.
Un soir, après souper, Gondy s'imagina,
Parce que j'admirais Brute et Catilina,
Que j'étais un gaillard de la même encolure,
Et me fit du complot une entière ouverture.
Ne me voulait-il pas tuer le lendemain?
Je ne le désarmai qu'en faisant le Romain.

LA DUCHESSE.

Ah! Ah! cet engoûment pour Rome n'est qu'un masque
Sous lequel se retranche un conspirateur...

GRANDIN.

Hélas! oui, c'est un masque, un costume, un maintien
Fatigant à tenir, croyez-le. Je sais bien
Que je peux m'en tirer en éventant la mèche;
Mais, outre un sentiment d'honneur qui m'en empêche,
Car je ne suis pas traître, et tant pis pour qui l'est!
J'ai des jours de courage où mon rôle me plaît,
Depuis surtout, depuis que par ma politique
J'ai fait provision d'un sauveur domestique.

LA DUCHESSE.

Oui, vous vous amusez au bord d'un casse-cou
A prendre le vertige avec un garde-fou.

GRANDIN.

Ne me trahissez pas!

LA DUCHESSE.

Mais rien pour rien. J'exige
Que vous rompiez l'hymen.....

2. Explain the situation suggested by the last speech of LA DUCHESSE.

3. What was Émile Augier's contribution to the dramatic literature of the nineteenth century?

II.

Translate:

1. Depuis leur installation à Interlaken, Boris se traînant à peine, Tartarin, pour éviter à Sonia l'ennui d'une longue attente au guichet, sous des regards curieux, s'était chargé à ses risques et périls de cette corvée quotidienne. La poste aux lettres n'est qu'à dix minutes de l'hôtel, dans une large et bruyante rue faisant suite à la promenade et bordée de cafés, de brasseries, de boutiques pour les étrangers, étalages d'alpenstocks, guêtres, courroies, lorgnettes, verres fumés, gourdes, sacs de voyage, qui semblaient là tout exprès pour faire honte à l'Alpiniste renégat. Des touristes défilaient en caravanes, chevaux, guides, mulets, voiles bleus, voiles verts, avec le brimbalement des cantines à l'amble des bêtes, les pics ferrés marquant le pas contre les cailloux; mais cette fête, toujours renouvelée, le laissait indifférent. Il ne sentait même pas la bise fraîche à goût de neige qui venait de la montagne par bouffées, uniquement attentif à dépister les espions qu'il supposait sur ses traces.

2. Give a brief account of Daudet and his work, showing clearly the reasons for his importance among the novelists of the nineteenth century.

3. Discuss Daudet's style.

III.

1. Translate:

(a) Dans le ciel clair rayé par l'hirondelle alerte,
Le matin qui fleurit comme un divin rosier
Parfume la feuillée étincelante et verte
Où les nids amoureux, palpitants, l'aile ouverte,
A la cime des bois chantent à plein gosier
Le matin qui fleurit comme un divin rosier
Dans le ciel clair rayé par l'hirondelle alerte.
En grêles notes d'or, sur les graviers polis,
Les eaux vives, filtrant et pleuvant goutte à goutte,
Caressent du baiser de leur léger roulis
La bruyère et le thym, les glaïeuls et les lys;
Et le jeune chevreuil, que l'aube éveille, écoute
Les eaux vives, filtrant et pleuvant goutte à goutte
En grêles notes d'or, sur les graviers polis.

(b) Si l'Aurore, toujours, de ses perles arrose
 Cannes, géroflers et maïs onduleux;
 Si le vent de la mer, qui monte aux pitons bleus,
 Fait les bambous géants bruire dans l'air rose;
 Hors du nid frais blotti parmi les vétivers
 Si la plume écarlate allume les feuillages;
 Si l'on entend frémir les abeilles sauvages
 Sur les cloches de pourpre et les calices verts;
 Si le roucoulement des blondes tourterelles
 Et les trilles aigus du cardinal siffleur
 S'unissent çà et là sur la montagne en fleur
 Au bruit de l'eau qui va mouvant les herbes grêles;
 Avec ses bardeaux roux jaspés de mousses d'or
 Et sa varangue basse aux stores de Manille,
 A l'ombre des manguiers où grimpe la vanille
 Si la maison du cher aïeul repose encor;
 O doux oiseaux bercés sur l'aigrette des cannes,
 O lumière, ô jeunesse, arôme de nos bois,
 Noirs ravins, qui, le long de vos âpres parois,
 Exhalez au soleil vos brumes diaphanes!
 Salut! Je vous salue, ô montagnes, ô cieux,
 Du paradis perdu visions infinies,
 Aurores et couchants, astres des nuits bénies,
 Qui ne resplendirez jamais plus dans mes yeux!

2. Comment on the stanza-structure in (a).

3. State the characteristics of the school of poetry to which Leconte de Lisle belonged, and show his position in that school.

4. Explain the significance of the following lines.

DO NOT TRANSLATE.

Puisqu'il n'est, par delà nos moments révolus,
 Que l'immuable oubli de nos mille chimères,
 A quoi bon se troubler des choses éphémères?
 A quoi bon le souci d'être ou de n'être plus?
 J'ai goûté peu de joie, et j'ai l'âme assouvie
 Des jours nouveaux non moins que des siècles anciens.
 Dans le sable stérile où dorment tous les miens
 Que ne puis-je finir le songe de la vie!

IV.

1. Give briefly Sainte-Beuve's estimate of Delille.

2. Explain the essential features of Sainte-Beuve's method of literary criticism, referring to his essay on Delille.

FRENCH.

LAMARTINE, HUGO, BALZAC, ROMANCIERS
NATURALISTES.

HONOUR.

Examiner—VICTOR DE BEAUMONT.

NOTE—Translate only the passages specified.

1. Translate:

Toute ma longue nuit déjà s'est écoulée
A presser dans mes doigts sa main toujours gelée,
A rappeler vingt fois le sang et la chaleur
A la plante des pieds réchauffés sur mon cœur,
A retenir la biche à côté sur sa mousse,
Pour que de son duvet la tiédeur saine et douce,
En se communiquant de plus près corps à corps,
Ranimât par degrés ses membres demi-morts;
A mouiller d'un peu d'eau par la flamme attiédie
Sa tête ensanglantée ou sa tempe engourdie;
A voir vers le matin son souffle sommeiller;
A retenir le mien de peur de l'éveiller:
Puis, quand l'accablement qui succède au délire
A son haleine égale à la fin s'est fait lire,
J'ai saisi par instinct ce moment de repos
Pour essuyer le sang qui durcit ses caillots;
J'ai déchiré la toile, et de ses découpures
Arraché fil à fil le duvet des blessures.

—*Jocelyn.*

2. Sketch the more important events in French history from 1850 to 1872, and indicate any connection between them and the life and work of Victor Hugo.

3. Write explanatory notes on the italicized expressions in the following passage.

—Sire! on t'a retiré de ton *Panthéon bleu!*
Sire! on t'a descendu de *ta haute colonne!*
Regarde. Des brigands dont l'essaim tourbillonne,
D'affreux bohémiens, des vainqueurs de charnier
Te tiennent dans leur mains et t'ont fait prisonnier.
A ton orteil d'airain leur patte infâme touche.
Ils t'ont pris. Tu mourus, comme un astre se couche,
Napoléon le Grand, empereur; tu renais
Bonaparte, *écuyer du cirque Beauharnais.*
Te voilà dans leurs rangs, on t'a, l'on te harnache.
Ils t'appellent tout haut grand homme, entre eux,
ganache.

Ils traînent, sur Paris qui les voit s'étaler,
Des sabres qu'au besoin ils sauraient avaler.
Aux passants attroupés devant leur habitacle,
Ils disent, entends-les:—*Empire à grand spectacle!*
Le pape est engagé dans la troupe; c'est bien,
Nous avons mieux; le czar en est; mais ce n'est rien.
Nous avons avec nous *le bonhomme de bronze!*
—*L'Expiation.*

4. Translate:

Les fontis avaient des causes diverses: la friabilité du sol; quelque éboulement à une profondeur hors de la portée de l'homme; les violentes averses de l'été; l'ondée incessante de l'hiver; les longues petites pluies fines. Parfois le poids des maisons environnantes sur un terrain marneux ou sablonneux chassait les voûtes des galeries souterraines et les faisait gauchir, ou bien il arrivait que le radier éclatait et se fendait sous cette écrasante poussée. Le tassement du Panthéon a oblitéré de cette façon, il y a un siècle, une partie des caves de la montagne Sainte-Genève. Quand un égout s'effondrait sous la pression des maisons, le désordre, dans certaines occasions, se traduisait en haut dans la rue par une espèce d'écartés en dents de scie entre les pavés; cette déchirure se développait en ligne serpentante dans toute la longueur de la voûte lézardée, et alors, le mal étant visible, le remède pouvait être prompt.

—*Les Misérables.*

5. Write a paper showing the various reasons for calling *Ruy Blas* a *romantic* drama. Support your statements by specific references to the play, wherever possible.

6. Translate:

Après un long examen des fantaisies capriolantes des locataires qui n'offraient rien de normal, qui se succédaient en renversant les institutions de leurs devanciers, ni plus ni moins que les dynasties, il s'était octroyé une chartre, mais il l'observait religieusement. Ainsi, le bonhomme ne réparait rien; aucune cheminée ne fumait, ses escaliers étaient propres, ses plafonds blancs, ses corniches irréprochables, les parquets inflexibles sur leurs lambourdes, les peintures satisfaisantes; la serrurerie n'avait jamais que trois ans, aucune vitre ne manquait, les fêlures n'existaient pas, il ne voyait de cassures au carrelage que quand on quittait les lieux, et il se faisait assister pour les recevoir d'un serrurier, d'un peintre vitrier, gens, disait-il, fort accommodants. Le

preneur était d'ailleurs libre d'améliorer; mais, si l'imprudent restaurait son appartement, le petit Molineux pensait nuit et jour à la manière de le déloger pour réoccuper l'appartement fraîchement décoré; il le guettait, l'attendait et entamait la série de ses mauvais procédés.—*César Birotteau.*

7. Translate:

Les glaces de la voiture étaient baissées, et tous les rideaux flottaient agités par la course rapide. Quelques personnes seulement occupaient l'intérieur (car on préférait, par ces jours chauds, l'impériale ou les plates-formes). C'étaient de grosses dames aux toilettes farces, de ces bourgeoises de banlieue qui remplacent la distinction dont elles manquent par une dignité intempestive; des messieurs las du bureau, la figure jaunie, la taille tournée, une épaule un peu remontée par les longs travaux courbés sur les tables. Leurs faces inquiètes et tristes disaient encore les soucis domestiques, les incessants besoins d'argent, les anciennes espérances définitivement déçues; car tous appartenaient à cette armée de pauvres diables râpés qui végètent économiquement dans une chétive maison de plâtre.—*En Famille.*

8. Describe the work of Balzac, Flaubert, Zola, and Guy de Maupassant, and indicate their respective significance in the realistic movement.

FRENCH.

HONOUR.

Examiner—J. SQUAIR.

I.

(1) Sketch briefly the condition of dramatic composition in France since 1880.

(2) Give a brief sketch of the life of Lamartine between 1820 and 1850.

(3) What were the chief causes for the development of realism in French literature?

(4) Write notes on: Pierre Loti, Guizot, Pailleron, Salammbô, Goncourt, *Germinal*, le Comte de Monte-Cristo, les Burgraves, Emaux et Camées, le Médecin de Campagne.

II.

In the case of the following extracts give (a) a title to or brief synopsis of each, (b) assign each to its proper school, (c) give your reason for such assignment.

(a) Madame Caroline eut un mouvement de recul. C'était, au fond de la cour, derrière une véritable barricade d'immondices, un des trous les plus puants, une masure écrasée dans le sol, pareille à un tas de gravats que des bouts de planches soutenaient. Il n'y avait pas de fenêtre. Il fallait que la porte, une ancienne porte vitrée, doublée d'une feuille de zinc, restât ouverte, pour qu'on vît clair; et le froid entraît, terrible. Dans un coin, elle aperçut une pailleasse, jetée simplement sur la terre battue. Aucun autre meuble n'était reconnaissable, parmi le pêle-mêle de tonneaux éclatés, de treillages arrachés, de corbeilles à demi pourries, qui devaient servir de sièges et de tables. Les murs suintaient, d'une humidité gluante. Une crevasse, une fente verte dans le plafond noir, laissait couler la pluie, juste au pied de la pailleasse. Et l'odeur, l'odeur surtout était affreuse, l'abjection humaine dans l'absolu dénuement.

Translate (a).

(b) Faire le poème de la conscience humaine, ne fût-ce qu'à propos d'un seul homme, ne fût-ce qu'à propos du plus infime des hommes, ce serait fondre toutes les épopées dans une épopée supérieure et définitive. La conscience, c'est le chaos des chimères, des convoitises et des tentatives, la fournaise des rêves, l'ancre des idées dont on a honte; c'est le pandémonium des sophismes, c'est le champ de bataille des passions. A de certaines heures, pénétrez à travers la face livide d'un être humain qui réfléchit et regarde derrière, regardez dans cette âme, regardez dans cette obscurité. Il y a là, sous le silence extérieur, des combats de géants comme dans Homère, des mêlées de dragons et d'hydres et des nuées de fantômes comme dans Milton, des spirales visionnaires comme chez Dante.

(c) Le soleil déclinait; le soir prompt à le suivre
Brunissait l'horizon; sur la pierre d'un champ,
Un vieillard, qui n'a plus que peu de temps à vivre,
S'était assis pensif, tourné vers le couchant.
C'était un vieux pasteur, berger dans la montagne,
Qui jadis, jeune et pauvre, heureux, libre et sans
lois,
A l'heure où le mont fuit sous l'ombre qui le gagne,

Faisait gaîment chanter sa flûte dans les bois.
Maintenant riche et vieux, l'âme du passé pleine,
D'une grande famille aïeul laborieux.
Tandis que ses troupeaux revenaient dans la plaine,
Détaché de la terre, il contemplait les cieux.
Le jour qui va finir vaut le jour qui commence.
Le vieux penseur rêvait sous cet azur si beau.
L'Océan devant lui se prolongeait, immense,
Comme l'espoir du juste aux portes du tombeau.
O moment solennel ! les monts, la mer farouche,
Les vents faisaient silence et cessaient leur clameur.
Le vieillard regardait le soleil qui se couche ;
Le soleil regardait le vieillard qui se meurt.

(d) Le Zéphyr à la douce haleine
Entr'ouvre la rose des bois,
Et sur les monts et dans la plaine
Il féconde tout à la fois.
Le lys et la rouge verveine
S'échappent fleuris de ses doigts,
Tout s'enivre à sa coupe pleine
Et chacun tressaille à sa voix.
Mais il est une frêle plante
Qui se retire et fuit, tremblante,
Le baiser qui va la meurtrir.
Or, je sais des âmes plaintives
Qui sont comme les sensitives
Et que le bonheur fait mourir.

(e) La lune s'attristait. Des séraphins en pleurs
Rêvant, l'archet aux doigts, dans le calme des fleurs
Vaporeuses, tiraient de mourantes violes
De blancs sanglots glissant sur l'azur des corolles.
—C'était le jour béni de ton premier baiser.
Ma songerie aimant à me martyriser
S'enivrait savamment du parfum de tristesse
Que même sans regret et sans déboire laisse
La cueillaison d'un Rêve au cœur qui l'a cueilli.
J'errais donc, l'œil rivé sur le pavé vieilli,
Quand, avec du soleil aux cheveux, dans la rue
Et dans le soir, tu m'es en riant apparue.
Et j'ai cru voir la fée au chapeau de clarté
Qui jadis sur mes beaux sommeils d'enfant gâté
Passait, laissant toujours de ses mains mal fermées
Neiger de blancs bouquets d'étoiles parfumées.

(f) Donc, parmi les étendards et les fanfares, entre les
haies de peuple et les chœurs, sous les arcs démocratiques
et tricolores parurent : d'abord, sa figure poupine, blanche

et grasse de virtuelles banqueroutes, le joli président de la Lyre du Commerce, porteur de bouquets offerts par les dames de boutique; ses adjoints ensuite, importants spéculateurs de céréales, riches et le montrant par leurs doigts bagués; l'ex-tambour major, héroïque et géant, décoré de Sébastopol, sauve-caniches, empêcheur de suicides, arrache-incendiés, batteurs d'ivrognes, cuirassé de plaques commémoratives, et qui élevait la lourde bannière cramoisie, palmée, laurée, couronnée, décorée, resplendissante; derrière, gonflant leurs bajoues contre de tristes cuivres, les maigrettes silhouettes d'ouvriers sans honneurs et travestis en chefs de gare.

(g) Autour de nous, enfin, promenons nos regards;
Là, je vois de plus près, et j'admire les arts:
Le cyclope, noirci des feux qui l'entourent,
Verse à flots embrasés les métaux qui bouillonnent;
La flamme cuit le vase arrondi sous nos doigts;
L'acier ronge le fer, ou façonne le bois.
*Sur les fleuves profonds me formant une route,
Des rochers sous mes pas se sont courbés en voûte.*
Par les eaux ou les vents, au défaut de mes mains,
Le cylindre roulé met en poudre mes grains.
Ici l'or en habit se file avec la soie;
En des tableaux tissés la laine se déploie.
*Là, le sable, dissous par les feux dévorants,
Pour les palais des rois brille en murs transparents.*
Sur un papier muet la parole est tracée;
Par un mobile airain on grave la pensée:
Mille fois reproduite, elle vole en tous lieux.
Les temps a pris un corps, et marche sous mes yeux.

Explain the italicised portions in (g).

FRENCH PROSE PRIZE.

Examiner—J. SQUAIR.

1. Translate into French:

William the Conqueror was one day pensive and pre-occupied. He said to his counsellors, "I should like to know what will be the destiny of my sons."

The counsellors deliberated amongst them and decided to propose a question to each of the three princes, who were still almost children.

The first who entered the room was Robert. "Good sir," said one of the counsellors to him, "deign to answer

us. If God had made you a bird, what bird should you have liked to be?" "A falcon," replied Robert, "that is the bird which most resembles a brave and valiant knight."

William entered next, and to the same question he replied, "I should like to have been an eagle; he is a strong and powerful bird; he is feared by all the other birds, and thus he is their king."

Lastly, the youngest of the three sons, Henry, who was fond of instruction, and who has for that reason been surnamed "Beauclerc", replied, "I should like to have been a starling (*étourneau*) because it is a simple and kind bird, which lives without injuring anybody."

2. Write a short composition in French on *one* of the following topics:-

- (a) Un tiens vaut mieux que deux tu l'auras.
- (b) La vie de Victor Hugo.
- (c) Les industries du Canada.
- (d) Les joies de la lecture.

ITALIAN.

HONOUR.

Examiner—W. H. FRASER, M.A.

N. B.—Candidates in Italian of Division I (minor) will omit Part I of this paper.

I.

1. Translate:

L'angel di Dio, dopo il divin precetto,
tolse la Visione in compagnia,
e lieto se n'andò volando a Roma;
poi si vestì de la canuta imago
del Vicario di Cristo, e, camminando
per piani, monti e mar, giunse a Durazzo:
e quivi, innanzi l'apparir de l'alba,
trovò l'Imperator dal sonno oppresso
ne la camera sua, sopra il suo letto.

2. Name the author and the work.

3. What is meant by *Vicario di Cristo* (l. 5) ?

4. Connect the poem with what preceded and followed it in the history of the Italian epic.

5. Translate:

Così diss'egli (= coro); e poi, tra labbro e labbro,
mi pose un favo di soave mele,
e lieto se n'andò volando al cielo
Ond'io, da tal divinità spirato,
non temerò cantare i vostri onori
con verso etrusco dalle rime sciolto.

6. Name the author and work.

7. Comment on the announcement made in the last three lines.

8. Translate:

Bisogna, adunque, essere volpe a conoscere i lacci, e
lione a sbigottire i lupi. Coloro, che stanno semplicemente
sul leone, non se ne intendono. Non può pertanto un signor
prudente, nè debbe osservar la fede, quando tale osservanzia
gli torni contro, e che sono spente le cagioni, che la feciono
promettere. E se gli uomini fossero tutti buoni, questo precetto
non saria buono; ma perchè sono tristi, e non l'osserverebbono a
te, tu ancora non l'hai da osservare a loro. Nè mai, a un
principe, mancarono cagioni legittime di colorare l'inosservanza.

9. Give modern Italian forms for *osservanzia*, *feciono*,
fussero, *saria*, *osserverebbono*.

10. What is the title, and what was the object of this work?

11. What evidence of Machiavelli's patriotism is found in the extract prescribed for reading?

12. Translate:

Rispose allor il conte: Anzi, all'animo ed al corpo appartiene
la operazione dell'arme. Ma non voglio, messer Pietro, che voi
di tal causa siate giudice, perchè sareste troppo sospetto ad una
delle parti: ed, essendo già stata questa disputazione lungamente
agitata da uomini sapientissimi, non è bisogno rinnovarla; ma io
la tengo per diffinita in favore dell'arme, e voglio che 'l nostro
cortegiano, poich'io posso ad arbitrio mio formarlo, ancor così la
estimi.

13. Name the work and the author.
14. What is the plan and object of the work?
15. Who is *messer Pietro* (l.2), and for what is he noted in literature?
16. Translate:
- E come quel, ch'ancor, de la pazzia,
 non era ben guarito intieramente,
 per allargare innanzi al re la via,
 menava quella mazza fra la gente,
 ch'un imbrocato svizzero paría,
 di quei, che, con villan modo insolente,
 sogliono innanzi 'l Papa, il dì di festa,
 rompere a chi le braccia, a chi la testa.
17. Explain the allusion in the last four lines.
18. This work represented a new departure in literature. Explain this statement.
19. Translate:
- Nè i mesti, de la dea Pallade, studi
 ti son meno odiosi: avverso ad essi
 ti feron troppo i queruli ricinti,
 ove l'arti migliori e le scienze,
 cangiate in mostri e in vane orride larve,
 fan le capaci volte echeggiar sempre
 di giovanili strida.
20. Point out characteristics of claccisism in the extract.
21. Whom is the author addressing?
22. Translate:
- E, a questi marmi
 venne spesso Vittorio ad ispirarsi.
 Irato a' patri numi, errava muto
 ove Arno è più deserto, i campi e il cielo,
 desioso, mirando; e poi che nullo
 vivente aspetto gli molcea la cura,
 qui posava l'austero: e avea, sul volto,
 il pallor della morte e la speranza.
 Con questi grandi, abita eterno: e l'ossa
 fremono amor di patria.
23. Explain the allusions in *questi marmi* (l. 1), *Vittorio* (l. 2), *l'ossa fremono amor di patria* (ll. 9, 10).

24. What connection has the title *Carme dei Sepolcri* with the purpose of the poem?

II.

Translate:

Lucia stava immobile in quel cantuccio, tutta in un gomitolo, con le ginocchia alzate, con le mani appoggiate sulle ginocchia, e col viso nascosto nelle mani. Non era il suo nè sonno nè veglia, ma una rapida successione, una torbida vicenda di pensieri, d'immaginazioni, di spaventi. Ora, più presente a sè stessa, e rammentandosi più distintamente gli orrori veduti e sofferti in quella giornata, s'applicava dolorosamente alle circostanze dell'oscura e formidabile realtà in cui si trovava avviluppata; ora la mente, trasportata in una regione ancor più oscura, si dibatteva contro i fantasmi nati dall'incertezza e dal terrore. Stette un pezzo in quest'angoscia; infine, più che mai stanca e abbattuta, stese le membra intormentite, si sdraiò, o cadde sdraiata, e rimase alquanto in uno stato più somigliante a un sonno vero.

III.

(Omit either question 1 or question 2.)

1. Give some account of the rise of the Romantic Epic in Italian literature.
2. Give some account of the Italian literature of the last half of the 18th century.
3. Write a note on the Novel in the 16th century, giving names of any three writers.
4. Describe the lyric poetry of the 16th century, and name any three writers.
5. Write notes on any *five* of the following authors or works: Manzoni, Gravina, Galileo, Leopardi, Berchet, Rinuccini, Maffei, Scherno degli Dei, Filicaia, Adone, l'Aminta, Berni, Mandragola, Vasari.

ITALIAN.

HONOUR.

Examiner—N. DI PIETRO, D. LIT.

I.

1. Translate:

La vergine tra 'l vulgo uscì soletta;
Non copri sue bellezze, e non l'espose;
Raccolse gli occhi, andò nel vel ristretta,
Con ischive maniere e generose.

5 Non sai ben dir s'adorna, o se negletta;
Se caso od arte il bel volte compose;
Di natura d'amor, de'cieli amici
Le negligenze sue sono artifici.

Mirata da ciascun passa e non mira
10 L'altera donna, e innanti al re sen viene;
Nè, perchè irato il veggia, il piè ritira,
Ma il fero aspetto intrepida sostiene.

Vengo, signor, gli disse, e'n tanto l'ira
Prego sospenda e 'l tuo popolo affrene,
15 Vengo a scoprirti, e vengo a darti preso
Quel reo che cerchi, onde sei tanto offeso.

2. Give colloquial Italian equivalents for *vulgo* (l. 1), *innanti* (l. 10), *veggia* (l. 11).

3. Who is the speaker, and who is addressed in ll. 13-16?

4. Outline the episode from which these stanzas are taken, and indicate its connection with the narrative of the poem.

5. Remark on the form *affrene* (l. 14).

6. Translate:

Amico, hai vinto: io ti perdon . . . perdona
Tu ancora, al corpo no, che nulla pave,
A l'alma sì: deh! per lei prega, e dona
Battesmo a me ch'ogni mia colpa lave.

5 In queste voci languida risuona
Un non so che di flebile e söave
Ch'al cor gli scende, ed ogni sdegno ammorza,
E gli occhi a lagrimar gli invoglia e sforza.

Poco quindi lontan nel sen del monte
10 Scaturía mormorando un picciol rio.
Egli v'accorse, e l'elmo empì nel fonte,
E tornò mesto al grande ufficio e pio.
Tremar sentì la man, mentre la fronte

Non conosciuta ancor sciolse e scoprío.

15 La vide, e la conobbe; e restò senza
E voce e moto. Ahi vista! ahi conoscenza!

7. Give colloquial Italian equivalents for *pave* (l. 2).
alma (l. 3), *battésimo* (l. 4), *rio* (l. 10), *empiè* (l. 11).

8. Name the form of stanza and the metre in which
this poem is written.

9. Scan either line 12 *or* line 16.

10. Relate briefly the episode from which these stanzas
are taken, naming also the persons concerned.

11. Translate:

O sempre, e quando parti, e quando torni
Egualmente crudele, or chi ti guida?
Gran meraviglia ch'l morir distorni,
E di vita cagion sia l'omicida.
Tu di salvarmi cerchi? a quali scorni,
A quali pene è riservata Armida?
Conosco l'arti del fellone ignote;
Ma ben può nulla, chi morir non pôte.

12. Explain the allusion in lines 1 and 2.

13. Indicate the part taken by Armida in the action
of the poem.

14. (a) Write a brief biographical sketch of Torquato
Tasso down to the publication of the *Gerusalemme
Liberata* *or* (b) Give some account of Italian epic poetry
from the *Orlando Furioso* to the *Gerusalemme Liberata*.

II.

Translate:

ALLA CAMERA DEL PETRARCA.

O cameretta, che già in te chiudesti
Quel grande, alla cui fama è angusto il mondo,
Quel sì gentil d'amor mastro profondo,
Per cui Laura ebbe in terra onori celesti;
O di pensier soavemente mesti
Solitario ricovero giocondo,
Di quai lagrime amare il petto inondo
Nel veder ch'oggi inonorata resti!
Prezioso diaspro (*jasper*), agata ed oro
Foran debito fregio, e appena degno
Di rivestir sì nobile tesoro.
Ma no: tomba fregiar d'uom ch'ebbe regno
Vuolsi, e por gemme ove disdice alloro:
Qui basta il nome de quel divo ingegno.

Vittorio Alfieri.

SPANISH.

HISTORY OF LITERATURE.
GENERAL AND HONOUR.

Examiner—M. A. BUCHANAN, B.A., PH.D.

N. B.—Candidates in the Spanish of Division I (minor) and of the General Course will omit Part I of this paper.

I.

1. Translate:

No he de callar, por más que con el dedo,
Ya tocando la boca, ó ya la frente,
Silencio avises ó amenaces miedo.

¿No ha de haber un espíritu valiente?
¿Siempre se ha de sentir lo que se dice?
¿Nunca se ha de decir lo que se siente?

Hoy sin miedo que libre escandalice
Puede hablar el ingenio, asegurado
De que mayor poder le atemorice.

En otros siglos pudo ser pecado
Severo estudio y la verdad desnuda,
Y romper el silencio el bien hablado.

Pues sepa quien lo niega y quien lo duda
Que es lengua la verdad de Dios severo
Y la lengua de Dios nunca fué muda...

2. (a) To whom is the satire addressed? (b) What does it satirise?

3. Tell the story of *Un castellano leal* by the Duque de Rivas, and of *A buen juez mejor testigo* by José Zorrilla.

4. Translate:

En las largas noches
Del helado invierno,
Cuando las maderas
Crujir hace el viento
Y azota los vidrios
El fuerte aguacero,
De la pobre niña
Á solas me acuerdo.

Allí cae la lluvia
Con un son eterno;
Allí la combate
El soplo del cierzo.
Del húmedo muro
Tendida en el hueco,
Acaso del frío
Se hielan sus huesos!..

5. How would you characterise Bécquer's writings?

6. Write notes on the following works, *El Buscón*, *El Diablo cojuelo*, *El Delincuente honrado*, *Los eruditos á la violeta*, *Fray Gerundio*.

7. Indicate the importance of the following playwrights in the history of the Spanish drama: Torres Naharro, Lope de Rueda, Lope de Vega, Calderón, Moratín (the younger), Ramón de la Cruz, Bretón de los Herreros, Hartzzenbusch, José Zorrilla, Echegaray.

II.

8. Translate at sight:

Apenas me dí cuenta de los restantes sucesos del día, no obstante la activa parte que tomé en ellos por razón del cargo que desempeñaba allí. Sé que la suspensión de hostilidades lograda por negociaciones entre el Gobierno y una junta de armamento y defensa, formada aquella misma madrugada por hombres notables del partido progresista, bajo la presidencia del general San Miguel, duró sólo algunas horas; que á media tarde se reprodujo con mayor saña la refriega en todos los barrios de la villa; que me batí de nuevo hasta el anochecer; y que entonces, nombrado capitán general de Madrid y ministro de la Guerra San Miguel, hizo saber éste, *urbi et orbi*, que había sido llamado Espartero para formar ministerio y arreglar la cosa política tal cual se quería en el Manifiesto de los generales pronunciados; con lo cual abrazáronse tropas y paisanos; y, con gran regocijo de todos, acabóse aquella bárbara matanza; pero quedando el pueblo armado en sus barricadas, "por si acaso"... Lleváronse los heridos á los hospitales, y los muertos al campo santo. ¡Pobre Balduque! Si se supo en qué lugar del mundo reposaban tus honrados huesos, á mi previsión fué debido y á la fidelidad de dos hombres que no se separaron de tu cadáver hasta dejar señalada con una cruz la tierra que le cubrió. No pude hacer más por ti en aquel instante.—Pereda, *Pedro Sánchez*.

III.

9. Write a short biography of either Lope de Vega or Calderón.

10. Define the periods into which Spanish literature since 1580 can be divided.

11. Discuss Romanticism in Spain, noting especially foreign influences.

12. Comment briefly upon any five of the following writers: Vélez de Guevara, Meléndez Valdés, Espronceda, Fernán Caballero, Valera, Pereda, Pérez Galdós.

SPANISH.

(AMAR SIN SABER Á QUIÉN, ETC.)

GENERAL AND HONOUR.

Examiner—M. A. BUCHANAN, B.A., PH.D

1. Translate:

Tratábase de las damas
De Toledo, á quien el cielo
Dió tanta hermosura y gracia.
Dicen que una ley dispone
Que si acaso se levanta
Sobre un vocablo porfía
De la lengua castellana,
Lo juzque el que es de Toledo;
Y que otra ley promulgaba
Que en hablando de hermosura
Que entendimiento acompaña,
Sólo juzgarlo pudiera
Una dama toledana.
Aquí pues hablando dellas,
Necio don Pedro se alaba
De que una dama le quiere,
Le favorece y regala.
Celoso yo (que bien sabes
Que aunque los nombres se callan,
Bien se ve por las razones
Á quién le tiran las cañas),
Respondo que hay muchos necios
Que presumen que los aman,
De quien las damas se burlan,
Y quieren á los que callan.
Él replicó: “Nunca tuve
Sin favores confianza;
Pero la dama á quien sirvo,
Yo sé que me ha dado tanta,
Que prefiero á algún villano,
Que con necias esperanzas
Pretende la posesión
Que me ha dado su palabra,
Y que en la chancillería
De amor ejecutoriada
La tengo,

2. *quien* (l. 2). Comment upon the use of the singular.

3. Translate:

Por guardar á la amistad
El decoro que es razón,
Hoy á Madrid se ha partido;
Que obligado, no ha querido
Ofender la obligación,

Con todo encarecimiento
Me ha pedido que os amase,
Que sirviese y que mirase
Vuestro gran merecimiento.

Llorando al fin se partió,
Por no estorbar vuestro gusto,
Diciendo que era más justo
Que dél me olvidase yo;

Y que no pudiendo ser,
Estando siempre presente,
Me daba lugar ausente;
Que piensa que soy mujer.

Y aunque es verdad que lo soy,
No soy de las que en ausencia
Se mudan; que no en presencia
Con menos firmeza estoy,

Y le quiero, y es de suerte,
Que no le podré olvidar
Por mudanza de lugar,
Aunque me mude la muerte.

4. Write a note on the *Gracioso* in the plays that you have read.

5. (a) Characterise the Spanish *comedia*, with specific references to the plays read. (b) How does it differ from the Elizabethan drama, or from French plays of the classical period?

6. Scan two lines of both selections, naming the metre.

7. Translate: Digo que me aproximé á Clara desconfiado y corto, y he de añadir que hasta trémulo; pues no se me ocultaba á mí, aunque inexperto, que cuando un galán se acerca á una señorita está obligado á decirle algo que la distraiga y entretenga, siquiera para que el acto de cortesía no resulte pesada cruz para quien es objeto de él; y daba la maldita casualidad de que yo ni entonces fuí, ni después de rodar por el mundo he sido gran repentista en esto de sutilezas y perfiles galantes. Siempre pequé de soso al acercarme á una dama, y jamás se me venían á los labios las buenas ocurrencias hasta apartarme de ella, es decir, cuando

ya no las necesitaba. ¡Cómo envidiaba yo en aquel apurado trance las donosuras y bizarrías de ciertos diálogos que había leído en las novelas de mi casa! Hasta recordaba algunas de ellas que podían aplicarse al caso que me apuraba tanto, y aun tentado me ví en los primeros trasudores á encajarlas allí de corrido; pero, felizmente (y no se tome esto á vanidosa jactancia), á faltas de las apuntadas condiciones de travesura, he tenido siempre cierto buen sentido, del cual me he amparado para salir de apuros de este jaez, ya que no triunfante ni muy airoso, tampoco abochornado ni corrido.

HISTORY.

GENERAL.

Examiners—{W. STEWART WALLACE, B.A.
R. HODDER WILLIAMS, B.A.

(Only *five* questions to be answered, at least **two** in each part of the paper.)

I.

1. Outline the policy and estimate the success of the Benevolent Despots of Europe up to the outbreak of the French Revolution.

2. Show the division of parties in the Constitutional or National Assembly (1789-1791), and account for its failure to solve the questions with which it was confronted.

3. How far is it possible to condone the September massacres and the excesses of the Terror?

4. "The organiser of victory." Explain how this title came to be applied to Carnot.

5. Explain the causes of the rise to power of Napoleon Bonaparte.

6. Outline the dealings of Napoleon with Prussia, and consider its debt to his systems of re-organisation.

7. In what ways did the Peninsular War and the Moscow Campaign contribute to the fall of Napoleon?

II.

8 Compare, from a strategical point of view, Wolfe's attack on Quebec in 1759 with that made by Arnold and Montgomery in 1775. Illustrate your answer with sketch maps.

9. What was Carleton's policy with regard to the French-Canadians, and how far was it successful?

10. Give an account of the career of either Papineau or Joseph Howe.

11. Describe the formation of the Liberal-Conservative party in 1854.

12. To what extent has there been an Annexationist party in Canada, and from what quarters has it drawn its support?

13. Trace the growth of Protectionist principles in Canada.

14. Write short notes on the careers of the following: François Bigot, Sir James Craig, Sir John Colborne, Sir A. T. Galt, George Brown, Sir George Etienne Cartier.

HISTORY.

GENERAL.

Examiners—W. STEWART WALLACE, B.A.
R. HODDER WILLIAMS, B.A.

NOTE:—Only *five* questions to be answered at least two in each part of the paper.

I.

1. How far is it possible to arrive at a philosophy of history?

2. "George III was most supported when he was most wrong-headed." Discuss this statement.

3. Explain the comparative failure of *either* Charles James Fox *or* Edmund Burke as a politician.

4. Sketch the course of events in Ireland from 1782. to 1801.

5. How was England affected by Napoleon's Continental System?

6. Trace the growth of Free Trade principles in England between 1754 and 1860.

7. Sketch the movements which have taken place in the Church of England since 1754.

8. What changes has the Third Reform Bill brought about in English politics?

II.

9. "1783-1789, the critical period of American history. (Fiske). Explain the meaning of this description.

10. Why did the Missouri compromise not prove final?"

11. Why has the period following the fall of Napoleon been called "The age of congresses?"

12. Consider the causes and results of the revolutions of 1848 *either* in France *or* in Austria.

13. Was Gambetta anything more than a mere opportunist?

14. "A heart of gold, but the brains of an ox." (D'Azeglio). Do you accept this view of Garibaldi? Illustrate your answer by reference to his dealings with Cavour.

15. What were the problems that faced Italy after 1860 and to what extent have they been solved?

16. Can the Partitions of Poland be justified from any point of view?

17. Outline the aspirations of the Russian reformers in respect to the abolition of serfdom. Have they been realised?

18. Contrast the Hungarian problem as affecting Austria with the Irish problem as affecting Great Britain.

19. Can you account for the rivalry between Germany and Great Britain by a survey of German history during your period?

20. To what statesmen other than Bismarck does the German Empire owe its foundation?

CANADIAN CONSTITUTIONAL HISTORY.

GENERAL.

Examiners—EDWARD KYLIE, M.A.
W. S. WALLACE, B.A.

NOTE:—Only *five* questions to be answered, of which question 11 must be one.

1. "A vigorous paternalism." Explain and illustrate the applicability of this phrase to the government of New France.

2. Describe a typical seigniory in New France about the year 1700.

3. "The English Conquest shattered the whole apparatus of civil administration at a blow, but it left the church untouched" (Parkman). Discuss this statement.

4. "The very image and transcript of the constitution of Great Britain" (Governor Simcoe). How far was this an adequate description of the Constitutional Act?

5. What were the trade relations between Canada and Great Britain from 1791 to 1860?

6. How far was the meaning of Responsible Government, as applied to a colony, realized in Canada up to 1850?

7. When and how were the chief recommendations of Lord Durham's Report carried into effect?

8. Describe the formation of the McNab-Morin administration in 1854, and analyze the composition of the government and of the Opposition parties.

9. "Confederation was not the result of a popular movement." Explain and illustrate this statement.

10. What changes have taken place in the Canadian constitution since 1867?

11. Comment briefly on the following extracts:

(a) "The obligation of paying the tithes to the priests will depend upon the King's pleasure." (Articles of the Capitulation of Montreal).

(b) "While a due Preponderance on the side of government is so manifestly wanting in the Assembly, it is considered by well-wishers of government as a fortunate circumstance that the Revenue is not equal to the Expenditure." (Lieut.-Governor Milnes to the Duke of Portland, 1800).

(c) "The utter want of municipal institutions giving the people any control over the local affairs, may indeed be considered as one of the main causes of the failure of representative government." (Lord Durham's Report)

(d) "I have told the people plainly that, as I cannot get rid of my responsibility to the home government, I will place no responsibility on the council; that they are a *council* for the governor to consult, but no more." (Lord Sydenham to Lord John Russell, 1839).

(e) "The House of Commons shall, subject to the provisions of this Act, consist of one hundred and eighty one members, of whom eighty-two shall be elected for Ontario, sixty-five for Quebec, nineteen for Nova Scotia, and fifteen for New Brunswick." (The British North America Act, 1867.)

HISTORY.

HONOUR.

Examiner—GEORGE M. WRONG, M.A.

NOTE: Only *five* questions to be answered; at least one from Part B.

A.

1. "Turgot failed and Mirabeau failed; yet history has shown that each read the real need of France as those who secured power could not read it." Discuss the historical questions raised in this passage.

2. Explain the circumstances in which the French Convention of 1792 met and account for the extremes to which it went.

3. Compare in respect to efficiency the government of the Directory with that of the First Consul.

4. Estimate the possibility of success for Napoleon in his plans immediately after the Peace of Tilsit.

5. "The defeat of Napoleon at Waterloo was inevitable." Explain this statement.

B.

6. Estimate the extent to which Russia moved in conformity with Western thought in the nineteenth century.

7. "In Austria-Hungary everybody is irreconcilable." Illustrate this by the history of the last fifty years.

8. Show how the movement of thought in 1848 affected Germany.

9. Was Bismarck the author of German unity?

10. Explain the part played by Pius IX in the movement for unification in Italy.

11. Why did Napoleon III fail?

12. Show how the Crimean War affected the politics of Europe.

13. "The liberation of the American slave was more costly and has proved less effective for good than the emancipation of the serf in Russia." Discuss this statement.

14. Describe the situation in which the political views of Alexander Hamilton were developed and estimate the extent of his influence in forming the constitution of the United States.

15. Show how Austria was concerned in the problem of Italian unification.

16. Give a brief history of monarchy in France since 1815.

HISTORY.

HONOUR.

Examiners— GEORGE M. WRONG, M.A.
EDWARD KYLIE, M.A.

(Only *five* questions to be answered.)

1. "Chatham was a consummate opportunist. but nothing more." Discuss.

2. "While proclaiming himself thoroughly practical, Burke was lost in a maze of abstract ideas." How far is this true of Burke as a statesman and philosopher?

3. How far did Fox form a correct estimate of the French Revolution and of Napoleon?

4. Did English statesmen of the eighteenth century understand or sympathize with democracy?

5. "The neglect of sea power and not George III cost us the American colonies." Discuss.

6. Did the conception which George III held of the king's duties and powers differ from that held by the Stuarts?

7. "Everything on every side was full of traps and mines." (Burke) Is this true of the political situation in England from 1760 to 1782?

8. "The financial measures of the younger Pitt saved England from a revolution similar to that in France." Is this statement true and adequate?

9. "I am aware that the age is not what we all wish, but I am sure that the only means to check its degeneracy is heartily to concur in whatever is best in our time." (Burke). Would this be an adequate account of Peel's political principles?

10. Examine Palmerston's dealings with France as illustrating his character and methods.

11. What is the meaning and value of Tory Democracy?
12. "So far from broadening with years, Mr. Gladstone dwindled into a hasty and intolerant partisan." Discuss.
13. Does "a double dose of original sin" in the Irish account for the Irish problem?
14. "The early part of the nineteenth century revived in England the religious differences of the sixteenth." Discuss.
15. "Quebec was saved in 1776 by the French-Canadians." Discuss.
16. Review the history of representative institutions in Canada from 1791 to 1837 and show why they failed.
17. Do the events leading up to Confederation and the British North America Act support the view that Confederation was a "pact" or an "alliance" between English speaking and French speaking Canadians?
18. Trace the development of the Canadian West to 1869.
19. "He had all the prudence and all the imprudence of a true statesman." How far do these words describe the career and character of Sir John A. Macdonald?
20. Is there a philosophy of history?

CANADIAN CONSTITUTIONAL HISTORY. HONOUR.

Examiners—EDWARD KYLIE, M.A.
W. S. WALLACE, B.A.

Only *five* questions to be answered, of which question 10 must be one.

1. Explain the failure of the Company of New France both as a commercial and as a political venture.
2. Describe the relations existing between the Governor and the Intendant in New France from 1663 to 1760.
3. What rights and privileges were guaranteed to the French-Canadians at the time of the Conquest?
4. What were the boundaries of Canada in 1763, in 1774, and in 1782? Illustrate your answer with sketch maps.
5. "The fatal compromise of the Constitutional Act, which, without repealing the Quebec Act which had arrayed the two races against each other, simply furnished each with a weapon to smite the other" (Shortt). Discuss this view.

6. How far were the ideals of the rebels of 1837 different in Upper and in Lower Canada?

7. Compare the attitude of Sydenham toward responsible government with that of Metcalfe.

8. "And be it enacted that in the Legislative Assembly of the Province of Canada, to be constituted as aforesaid, the parts of the said Province which now constitute the Provinces of Upper and Lower Canada respectively, shall, subject to the provisions hereinafter contained, be represented by an equal number of representatives to be elected for the places and in the manner hereinafter mentioned" (The Union Act). Point out in detail the results which flowed from the adoption of this clause.

9. What have been the fiscal relations between Canada and Great Britain since 1859?

10. Comment briefly on the following extracts:

(a) "We have thought fit to publish and declare. . . . that we have. . . . given express power and direction to our governors of our said colonies respectively, that so soon as the state and circumstances of the said colonies will admit thereof, they shall, with the advice and consent of the members of our Council, summon and call general assemblies within the said governments respectively" (Royal Proclamation, 1763).

(b) "It has been thought better calculated to secure the happiness of the Canadians, and more beneficial for all who live in the country, that they should have the civil law of Canada, and not that of England" (Lord North, in the debate on the Quebec Act).

(c) "It is difficult to understand how any English statesman could have imagined that representative and irresponsible government could be successfully combined" (Lord Durham's Report).

(d) "In any plan which may be adopted for the future management of Lower Canada, the first object ought to be that of making it an English Province." (Lord Durham's Report.)

(e) "It shall be lawful for the Queen, by and with the advice and consent of the Senate and House of Commons, to make laws for the peace, order, and good government of Canada, in relation to all matters not coming within the classes of subjects by this Act assigned exclusively to the Legislatures of the Province." (B.N.A. Act.)

MODERN HISTORY—PERIOD II.

HONOUR.

Examiner—J. J. BELL, M.A.

NOTE:—Only *five* to be answered.

1. Examine the constitutional importance of the judges under James I and Charles I.

2. “To argue *a posse ad actum* is no argument for a subject.” Did this appeal with force to Puritans of Stuart times?

3. “The session thus ended and the Parliament arisen. that intended Remonstrance gave us occasion to look into the business of Tonnage and Poundage; and therefore, though our necessities pleaded strongly for us, yet we were not apt to strain that point too far, but resolved to guide ourself by the practice of our most noble predecessors.” Put this into its proper setting and show how far the resolution was acted on with success.

4. Is it correct to charge Cromwellian times with a deficiency in political sense?

5. How far is it true to say that the seventeenth century disproves the contention that sovereignty must be divided?

7. “Consider whether this army be not a lawful power, called by God to oppose and fight against the King upon some stated grounds; and being in power to such ends may not oppose one name of authority for those ends as well as another name,—since it was not the outward authority summoning them that by *its* power made the quarrel lawful, but the quarrel that was lawful in itself.” Describe the political situation existing when Cromwell wrote this and show the significance of his opinion.

8. What conclusions can be drawn as to the intentions and methods of Charles II from the Treaty of Dover and the Declaration of Indulgence?

9. “Un Roy d’Angleterre qui veut être l’Homme de son peuple, est le plus grand Roy du Monde; mais s’il veut être quelque chose d’avantage, par Dieu il n’est plus rien.” Is this applicable to Charles II?

10. Discuss the truth of Dryden’s view of Shaftesbury.

MODERN HISTORY.

(PERIOD III.)

HONOUR.

Examiner—R. HODDER WILLIAMS, B.A.

Discuss five questions.

1. "What Joseph II aimed at, the French Revolution achieved."

2. "I carry in my heart the death-dirge of the French Monarchy. The dead remains of it will now be the spoil of the factious." (Mirabeau on his death bed.)

3. "The dictatorship of the Dantonist Committee so plainly saved the country in its worst peril that under many different names the French people have often recalled it, and rarely without success."

4. "In France the Napoleonic Codes were a symbol of a strict but enlightened despotism: in Germany and Italy they stood for liberty."

5. "The turning point in Napoleon's career was the moment when he passed beyond the policy which had planned the Confederation of the Rhine and roused by his oppression the one state which was still capable of giving a national life to Germany."

6. "The defensive campaign of 1814 in France was not a blunder; it was a crime."

7. "The greatest foe, considering his circumstances, which liberty ever had," (Lafayette of Napoleon.)

"The battle of Waterloo has been as fatal to the liberties of Europe as the battle of Philippi was to those of Rome." (Napoleon at St. Helena.)

8. "It was the long drawn out rivalries of the Eastern Question that shattered the political system of 1815."

9. "I adhere to my opinion that the real and effectual vindication of Lord Durham's memory and proceedings will be the success of a Governor General of Canada who works out his ideas of government fairly." (Earl of Elgin.)

10. "Had Napoleon III died before 1863 he would probably have left behind him in popular memory the name of a great ruler."

11. "Cavour had all the prudence and the imprudence of a true statesman."

12. "It was given to the war of 1870 to prove that the principle of nationality, so far from producing any progress in political morality, on the contrary leads men to return to the most barbarous practices." (Sorel).

HISTORY.

(SPECIAL PERIOD ESSAY.)

HONOUR.

Examiner—EDWARD KYLIE, M.A.

Write an essay on the following subject:

“Whoever has held the post of minister for any considerable time can never absolutely, unalterably, maintain and carry out his original opinions. He finds himself in the presence of situations that are not always the same—of life and growth—in connection with which he must take one course one day, and then, perhaps, another on the next day. I could not always run straight ahead like a cannon ball.”—*Bismarck*.

ARISTOTLE AND HOBBS.

HONOUR.

Examiner—EDWARD KYLIE, M.A.

1. “I would say that civil liberty can have no security without political power.” (Charles James Fox). Discuss the relations between civil liberty and political power.

2. Do Aristotle and Hobbes take sufficient account of the economic factor in history and in society?

3. How would Aristotle have regarded the French Revolution?

4. “The principles of politics are but those of morality enlarged” (Burke). Would Aristotle and Hobbes support this view?

5. Discuss the following passages with reference to their content.

(a) Let me now show that there are different forms both of democracy and of oligarchy, as will indeed be evident from what has preceded.

(b) Let us assume then that the best life, both for individuals and states, is the life of virtue, having external goods enough for the performance of good actions.

(c) For mankind are by no means agreed about the things to be taught, whether we look to virtue or the best life.

(d) To come now to the particulars of the true liberty of a subject ; that is to say, what are the things, which though commanded by the sovereign he may nevertheless, without injustice, refuse to do.

(e) Fifthly, supposing the number of counsellors equal, a man is better counselled by hearing them apart than in an assembly; and that for many causes.

POLITICAL ECONOMY.

GENERAL.

Examiners— $\left\{ \begin{array}{l} \text{JAMES MAVOR, PH.D.} \\ \text{G. I. H. LLOYD, M.A.} \\ \text{S. A. CUDMORE, B.A.} \end{array} \right.$

(Five questions only to be answered.)

1. What do you mean by an Economic Law? Illustrate by examples.

2. "Value is decided by the cost of production." "Value is decided by marginal utility." Discuss.

3. Indicate in what way the increased production of gold may be considered responsible for the present high cost of living.

4. On what principles does the price of a monopolized commodity depend? Discuss with examples. Is monopoly price necessarily higher than competitive price?

5. What is interest? Explain clearly the services rendered by capital in modern industry.

6. If Canada adopted the same banking system as prevails in the United States, making each branch of our present banks an independent institution, what would be the general effects on industry (a) in Nova Scotia, (b) in Saskatchewan?

7. Trace the effects of the development of transportation on the organization of markets, showing its influence on relative prices.

8. In the year 1910, British imports were £678,000,000, British exports £431,000,000; U.S. imports \$1,557,000,000, U.S. exports \$1,710,000,000; Canadian imports \$392,000,000, Canadian exports \$301,000,000.

Comment on the significance of this statement (a) from the Mercantilist's point of view, (b) from the modern economist's point of view.

PUBLIC FINANCE.

POLITICAL SCIENCE.

Examiners— JAMES MAVOR, PH.D.
G. I. H. LLOYD, M.A.

Five questions only to be answered.

1. Trace the historical relationship subsisting between Public Finance and Political Economy.
2. Show, by an analytical classification, the relation which public contributions bear to private benefits in a modern fiscal system.
3. Discuss the principles involved in the public administration of business enterprises.
4. What is a tax? What conclusions do you infer from your definition with regard to the bases of taxation or mode of assessment?
5. Examine the merits of progressive taxation of income, as illustrated by the experience of a particular country.
6. Summarize the theory of the incidence of a tax on rent and on wages respectively.
7. Is it desirable that all revenue shall be secured by means of a single tax? Discuss.
8. Discuss the principles underlying the creation and administration of a National Public Debt.

POLITICAL PHILOSOPHY.

POLITICAL SCIENCE.

Examiner—JAMES MAVOR, PH.D.

Five questions only to be answered.

1. "The history of political thought is a history of the ebb and flow of socialism." Examine this statement.
2. Define the following: Liberty, law, government, society.
3. Give an account of the political theories of Hobbes.
4. "Back to Aristotle." Explain this phrase.
5. What was the position of Bentham (*a*) in the field of law. (*b*) in the field of politics? (*c*) in the field of economics.

6. "Man is good but is depraved by society." Account for the vogue of this belief.

7. Is the prevailing political tendency in new communities towards rapid change or towards stability? Illustrate your answer by brief references to history.

8. What were the principal points in the social philosophy of Comte? What influence had he upon contemporary discussion.

TRANSPORTATION.

POLITICAL SCIENCE.

Examiner—JAMES MAVOR, PH.D.

Five Questions only to be answered.

1. Give an account of the transition from water to land transportation and indicate the extent to which the tradition of the one influenced the course of the other.

2. How are railway rates determined? Answer fully.

3. To what extent is a railway a monopoly?

4. What is the economic argument for the nationalisation of the railways?

5. What are the functions of a Railway Commission?

6. Account for the direction of the chief railway systems of North America and of Europe respectively.

7. Distinguish between "differentials" and "preferential rates."

8. Explain the following as applied to transportation: "joint-service," "long haul," "short haul," "cost of service."

BANKING AND CORPORATION FINANCE.

POLITICAL SCIENCE.

Examiners { JAMES MAVOR, PH.D.
G. I. H. LLOYD, M.A.
S. A. CUDMORE, B.A.

NOTE—Six questions to be answered, including two of 7, 8, and 9.

1. Give an account of the history of the Bank of England to 1844, showing how its peculiar connection with the Government has arisen.

2. Compare the distinguishing features of the Scottish system of banking with those of the Canadian.

3. "There is no more reason for a limitation on a bank's circulation than for a limitation on its deposits." Discuss.

4. What are the chief defects in the national banking system of the United States, as outlined in the report of the National Monetary Commission? What makes it difficult to substitute a Single Reserve for the existing Multiple Reserve?

5. Discuss the advisability of the following amendments to the Canadian Bank Act (foreshadowed by the Minister of Finance):

(a) The extension of the right of issuing emergency circulation to the months of September and February.

(b) The inspection of all Canadian banks by the officers of the Canadian Bankers' Association.

6. What are the economic functions of the clearing house? Show how these functions have naturally been extended in the case of the New York Clearing House.

7. "The trust-company is the department-store of finance." Explain, giving an account of the origin and the functions of trust-companies.

8. Discuss the various theories of the proper capitalization of public service corporations.

9. Give an account of the origin of the Stock Exchange, and outline the economic services rendered by it to society.

HISTORICAL AND ANALYTICAL JURISPRUDENCE.

HONOUR.

Examiner—A. H. F. LEFROY, M.A.

1. Explain "Historical" and "Analytical" Jurisprudence, illustrating the former so far as you can out of Sir Henry Maine's *Ancient Law* or his other books.

2. Mention and explain as fully as you can the various sources from which the rules of law are derived.

3. Discuss the proposition that law is a command of the sovereign power in a State.

4. Give with explanations the various classes of normal antecedent, substantive rights *in rem*.....

5. Analyse "a legal right"; and explain fully, with comments and illustrations, "remedial rights"; and the various classes of contracts, referring to any special points in connection with any of them which necessarily arise for legal determination.

6. What do you mean by "public Law" and state, with explanations, the various departments of law which come within it.

PUBLIC INTERNATIONAL LAW.
POLITICAL SCIENCE.

Examiner—MCGREGOR YOUNG, M.A., K.C.

1. Write a short note on the Bering Sea Arbitration of 1893.

2. Explain in general terms the work of the Second Peace Conference of The Hague.

3. Discuss the legality of:

(a) The use of savage troops in war.

(b) A Volunteer Navy.

4. *Explain* and *Illustrate* the jurisdiction over:

(a) A Merchant Vessel on the high seas.

(b) A Man-of-war in a friendly port in time of peace.

5. Explain the doctrine of Conditional Contraband, and show how it is dealt with by the Declaration of London. What are the provisions of the Declaration in regard to (a) destruction of prizes, and (b) condemnation of the vessel for carriage of contraband.

POLITICAL SCIENCE.

FEDERAL CONSTITUTIONAL LAW.

Examiner—MCGREGOR YOUNG, M.A., K.C.

1. Contrast, shortly, the Canadian and American systems with respect to Federal Courts.

2. Write a short note upon s. s. 16 of sec. 92, B.N.A. Act ("generally all matters of a merely local or private nature in the Province.")

3. "There is in the government of the United States no such a thing as a Cabinet in the English sense of the term." Explain fully.

4. Explain, shortly, *any three* material differences in the federal systems of Australia and Canada.

5. Illustrate the principle of *Tennant v. The Union Bank*. Would a statute of the Dominion Parliament providing that an owner of property could recover only such damages, for injuries thereto caused by a Dominion railway, if any, as should be determined by the Dominion Railway Board be valid. Give your reasons.

ETHICS—TEXTS.

GENERAL AND HONOUR..

Examiner—T. R. ROBINSON.

NOTE—Candidates must answer two questions only from each of the sections, A, B, and C. Answers should be explicit, but brief.

A.

1. State explicitly the grounds upon which David Hume rejects Reason as the source of moral distinctions.

2. Define carefully the terms Hedonism, Utilitarianism, Egoism, and in accordance with your definitions show to what extent each of these terms is applicable to the moral theory of Hume.

3. "Thus self-interest is the original motive to the establishment of justice, but a sympathy with the public interest is the source of the moral approbation which attends that virtue."

Explain the above statement of Hume by an exposition of his account of (a) The origin of Justice, (b) The origin of moral sentiment regarding Justice.

B.

4. "Our preparatory step must be to study the evolution of conduct." In connection with such study show :

(a) How Herbert Spencer defines conduct.

(b) How he distinguishes moral from non-moral conduct.

(c) What, according to Spencer, constitutes advance in the evolution of conduct.

5. "I conceive it to be the business of moral science to deduce, from the laws of life and the conditions of existence, what kinds of action necessarily tend to produce happiness and what to produce unhappiness."

Explain this statement by giving a fuller exposition of Spencer's ethical method, showing especially :

(a) The place occupied by pleasure in his system.

(b) The relation of Spencer's system to the earlier Utilitarianism of Bentham and J. S. Mill.

6. "With complete adaptation to the social state, that element in the moral consciousness which is expressed by the word 'obligation' will disappear."

Explain this statement carefully from Spencer's standpoint.

C.

7. "It is of the very essence of this doctrine that the divine principle, which we suppose to be realizing itself in man, should be supposed to realize itself in persons, as such."

"The man cannot contemplate himself as in a better state, or as on the way to the best, without, contemplating others, not merely as a means to that better state, but as sharing it with him."

Expound the above statements so as to shew clearly Green's conception, on the one hand, of the *personal*, and on the other, of the *social* character of the moral ideal.

8. "The first of the movements into which the development of morality may be analysed consists in gradual extension of the range of persons to whom the common good is conceived as common."

Explain this statement, and illustrate by any historical examples.

9. (a) Discuss the practical value of the moral ideal, as defined by Green.

(b) How, on Green's theory, could you account for the very different moral standards held in different countries and ages?

ETHICS—THEORY.

GENERAL AND HONOUR.

Examiner—G. J. BLEWETT.

NOTE: Candidates will take Part I, and any one question from each of the other parts—five questions in all.

PART I.

1. "I am a selfish man, as selfish as any man can be. But in me, somehow or other, so it happens, selfishness has taken the shape of benevolence."—Bentham.

Trace through the period of English ethics which you have studied, the question of the relation of individual good to public good.

2. (a) Describe the chief types of Hedonism. (b) Indicate Green's criticism of Hedonism.

PART II.—(any one question).

3. State, and discuss critically, Hume's doctrine of Utility. Compare that doctrine with "Utilitarianism."

4. Show what Hume means by the following: *Humanity*; *Benevolence*; *Sympathy*; *Self-Love*.

5. State, and discuss critically, Adam Smith's modification and extension of Hume's principle of Sympathy.

PART III.—(any one question).

6. According to what criterion, on Mr. Spencer's view, do we consider action as good or bad; and how has Mr. Spencer ascertained that criterion?

7. How, according to Mr. Spencer, does the study of evolving conduct give us a principle of the moral control of action; and how far is this a study of the genesis of the moral consciousness?

8. Discuss critically:

(a) Spencer's view that the sense of duty or moral obligation is transitory, and will diminish as fast as moralisation increases.

(b) Spencer's distinction between absolute and relative ethics.

PART IV.—(any one question).

9. Indicate, after Green:

(a) the form of all voluntary acts;

(b) how there can be differences in moral quality among such actions, when the form is in all cases the same.

10. How, from Green's point of view, would Intuitionism be criticised?

11. Trace, after Green, the chief factors and stages in the development of the moral ideal.

PHILOSOPHY—ETHICS.

GREEN.

HONOUR.

Examiner—J. GIBSON HUME, A.M., PH.D.

1. Write on *one* of the following:-

The Spiritual principle in Knowledge.

The Spiritual principle in Nature.

2. Give a careful statement of Green's criticism of J. S. Mill.

3. Discuss Green's treatment of the following: Freedom, Personality, Progress.

4. Critically discuss Green's use of the "eternal consciousness" in his system of Ethics.

ARISTOTLE AND KANT.

HONOUR.

Examiner—G. J. BLEWETT.

1. Indicate the broad contrast between the way in which Aristotle viewed the good, and the way in which Kant viewed it.

2. State briefly the social and historical movements which led to such a change of view.

3. Indicate the transition from Aristotle's metaphysical views, through philosophy of nature (specially the doctrine of Soul) to Ethics.

4. (a) Show how Aristotle's account of the Soul furnishes a basis for the classification of the virtues.

(b) Among the virtues, where is the standard or criterion really found? How far does this constitute a primacy of the "theoretical" over the "practical" reason?

(c) With regard to that relation of theoretical to practical reason, compare Kant's position with Aristotle's period.

5. What is for Aristotle the relation of Ethics to Politics?

6. (a) State in outline Kant's attempt to formulate the moral law.

(b) Indicate (1) the value, (2) the limitations, of this formulation.

7. (a) In Kant's view of the moral law as a "law of freedom," how far is Kant ascribing to us a consciousness of noumenal reality?

(b) How is such a position related to, and how far is it reconcilable with, the position to which Kant comes in the *Critique of the Pure Reason*?

SPECIAL PHILOSOPHY.

HISTORY OF PSYCHOLOGY.

Examiner—W. G. SMITH.

1. Indicate whether or not there was any development in Science among the Greeks which would bring about a Psychology of which Aristotle's *De Anima* may be taken as the best expression. In what relation did such Psychology stand to the general study of natural phenomena?

Can you give any account of how and why the views of Aristotle were elaborated into the Doctrine of the Soul as a Spiritual Substance?

2. Show whether or not there was any genuine advance toward a clarification of the subject matter of Psychology during the period of Scholasticism. Discuss critically with definite relation to what you hold to be the subject-matter of Psychology.

3. Compare the views of DesCartes and Locke in regard to the relation of the physical and intellectual Sciences. Critically examine DesCartes' and Locke's views of the relation of such sciences to their (Des C and L) views of Experience.

4. Show wherein, if at all, and how far, Rational and Empirical Psychology influenced Kant's Critique of Pure Reason. If such influences did operate, discuss whether or not Kant's Critique is an accurate account of human knowledge.

Is a Category a "form of knowledge," or a "form of expression" of such knowlege?

Are analysis and Synthesis oppositely different processes?

5. Discuss with the most careful use of words the different types which psychophysical parallelism has taken.

Wherein and how far is psychophysical parallelism actual in the view of psychology as the Science of Immediate Experience?

PHILOSOPHY.

HISTORY OF PHILOSOPHY.

Examiner—J. GIBSON HUME, A.M., PH.D.

1. Trace the discussion of:
 - (a) Space,
 - (b) Substance.
 - (c) Causality.
 - (d) Personal identity.Through Locke, Berkeley, Hume and Kant.
2. Write a brief criticism of the views presented in question 1.
3. Give a concise statement of how you would proceed to deal with these problems.

HISTORY OF PHILOSOPHY AND LOGIC.

HONOUR.

Examiners— $\left\{ \begin{array}{l} \text{G. S. BRETT.} \\ \text{ALBERT H. ABBOTT.} \end{array} \right.$

1. Discuss the influence of the Cartesian standpoint on later thinkers; limiting the discussion to the logical implications of that standpoint and treating especially (a) the nature of judgment; (b) the relation of analytic to synthetic judgments; (c) truth and error, how they are possible and how they are distinguished.

2. "What Kant discovers respecting the nature and operation of the understanding, as a faculty of sensible knowledge, like his discovery concerning Space and Time * * * * * tends to show that the mechanical relation between subject and object implies the organic one. * * * * * And thus Kant's work will show itself to be a "critical" one, as making a *crisis* or turning point in the progress of modern thought—a point of real transition from profitless and baseless negations to the recognition and demonstration of positive truth of living experience."

(1) Expound the pre-Kantian view (from 1600 A.D.) of the relation of subject and object, so as to bring out what you think the real problem in this connection was at the time of Kant.

(2) On the basis of your exposition state briefly whether you regard the above quotation as in the main a correct appreciation of Kant's work and the work of his predecessors.

PHILOSOPHY.

KANT.

HONOUR.

Examiner—J. GIBSON HUME, A.M., PH.D.

1. Write notes on the following terms used in Kant's writing: A priori, a posteriori, synthesis, experience, transcendental, transcendent, phenomena, noumena thing-in-itself, dogmatism, scepticism, criticism, deduction, Category.

2. Give Kant's treatment of *one* of the following, topics: (a) The Soul; (b) The Antinomies; (c) God's Existence.

3. In what sense does Kant claim Universality and Necessity for the principle of Causation? Compare Kant's view with that of David Hume and shew in each case how causation is related to moral action.

4. Give your own views on the following: (a) causality; (b) personality; (c) responsibility.

PHILOSOPHY—METAPHYSICS.

SPINOZA AND LEIBNITZ

HONOUR.

Examiner—ALBERT H. ABBOTT, B.A., PH.D.

1. (a) Outline Spinoza's doctrine of the relation of the Body and the Mind, developing it from fundamental considerations in his method, and emphasizing the significance of the doctrine for knowledge and for conduct.

(b) Compare Leibnitz doctrine of the relation of the Body and the Mind with Spinoza's view.

(c) Outline and amplify slightly what you would consider a fundamental critique of both Spinoza and Leibnitz in connection with the doctrine discussed.

METAPHYSIC.

(ARISTOTLE.)

HONOUR.

Examiner—G. J. BLEWETT.

1. What is Aristotle's conception of the task of metaphysic?

In dealing with this, be careful to make clear Aristotle's view of the four stages of knowledge. Compare Plato's view of the stages of knowledge; and also Spinoza's; and indicate any bearing which such views of the development of knowledge may have upon the Kantian distinction between Phenomena and Noumena.

2. Discuss the Aristotelian distinction between Matter and Form, under the following headings:

(a) How, upon the conception of the task of metaphysic, which you have already examined, Aristotle was led to this distinction at all.

(b) The doctrine of four causes. (c) The relation of the doctrine of Matter to the doctrine of Contingency.

(d) How far Aristotle's doctrine of Contingency was prepared for by the Platonic distinction between Science and Opinion.

(e) The relation between the doctrine of Form and Matter, and the doctrine of Universal and Particular. How far must Aristotle regard matter as the principle of individuation?

(f) God as pure form.

3. Discuss the Aristotelian doctrine of Reason (with special reference to Aristotle's dualism) under the following headings:

(a) Reason in God; and the relation of this reason to the cosmic process.

(b) Reason in man (active and passive reason; reason as theoretical and as practical).

(c) Reason in nature (its imperfect realisation of itself there).

ETHICS.

ST. MICHAEL'S COLLEGE.

GENERAL.

Examiner—J. J. PURCELL, J.C.B., S.T.L.

1. Discuss the Essence of Morality.

2. (a) Define—Law.

(b) Note the points of difference between the Natural and Positive law.

(c) "The Natural law is eternal and unchangeable." Explain and prove.

3. (a) Define—Conscience;

(b) Distinguish *correct* and *certain* conscience, *erroneous* and *doubtful* conscience, *practical* and *speculative* doubt.

(c) Prove that it is never lawful to act with a practical doubt.

(d) What must be done to avoid acting with a practical doubt?

4. What is meant by Rights and Duties?

(b) Define:-*connatural* and *acquired*, *alienable* and *inalienable*, *perfect* and *imperfect* rights.

(c) What principles are to be followed in settling conflicting claims?

5. What is meant by *wages*? How are we to determine the proper amount of wages to be paid to each labourer?

6. (a) "Murder is a greivous wrong." Discuss.

(b) "Under certain conditions it is lawful, in self-defense to kill an unjust aggressor" Explain the proposition.

LOGIC.

ST. MICHAEL'S COLLEGE.

HONOUR.

Examiner—J. J. PURCELL, J.C.B., S.T.L.

1. Discuss the nature of truth. Note the various states of the mind relative to truth.

2. What is meant by a criterion of truth? Outline the nature of the various criteria.

3. State the value of conscience as a criterion. Note its noumenal value. Prove.

4. Establish the claim of Natural Realism.

5. (a) Discuss logical truth in reference to Judgment and Perception.

(b) "Truth is immutable but admits of degrees." Explain.

6. Scepticism. (a) Note its origin; (b) Outline the grounds for doubt of Aenesidemus (c) Consider the effect of the scepticism of Hume in Sphere of Morals.

7. "Human Testimony and Common Consent are criteria of truth." Explain and prove.

PSYCHOLOGY.

ST. MICHAEL'S COLLEGE.

HONOUR.

Examiner—D. CUSHING, LL.D.

1. State and prove the nature of the union existing between the human soul and body. Account for their mutual interaction.

2. "The rational soul of man is the principle of all his operations." (a) Discuss. (b) How does this square with the opposition experienced between the sensible and rational appetites?

3. The essence of the human soul consists neither in thought, nor in power to think. Prove.

4. Discuss critically physiological and dynamic materialism.

5. Prove from the nature of the operations of the intellect and the will that the soul is spiritual and immortal.

6. Outline Scholastic teaching on the origin of the Soul. Justify your assertions.

HISTORY OF MODERN PSYCHOLOGY.

ST. MICHAEL'S COLLEGE.

HONOUR.

Examiner—J. J. PURCELL, J.C.B., S.T.L.

1. State the teaching of Descartes. (a) on the nature of the soul. (b) on the origin, extent and noumenal value of human knowledge.

2. Outline Spinoza's Philosophy of Mind.

3. State the teaching of Locke on the extent and value of human knowledge.

4. Leibniz. Explain his teaching on: (a) Origin of the Soul; (b) Value of our ideas.

5. Discuss briefly the Immaterialism of Berkeley.

6. Outline the salient features of Kant's Critique of Pure Reason.

METAPHYSICS.

PART II.

ST. MICHAEL'S COLLEGE.

HONOUR.

Examiner—J. J. PURCELL, J.C.B., S.T.L.

1. "The existence of God is demonstrable *a posteriori*.
(a) Indicate the main arguments and develop one.
(b) Explain the Kantian opposition to these arguments.
2. Discuss:
(a) "The Divine Nature is infinitely perfect."
(b) Privative and Negative Indetermination.
(c) Determination and Indetermination are predicable of God.
3. Attributes of God:— (a) Define and classify the Attributes of God; (b) "Logical composition is incompatible with the nature of God."—Prove this latter.
4. (a) Prove that God is an omniscient being. (b) State the object and the properties of divine knowledge. (c) Explain: *Scientia Visionis*, *Scientia Simplicis Intelligentiae*, *Scientia media*.
5. "God is the cause of the World."
(a) Indicate the various classes of causes and note the sense in which the term *cause* is applicable to God.
(b) Prove the proposition.
6. Discuss the nature and existence of Divine Providence. Note its relations to human liberty and to contingency.
7. Reconcile the Sanctity of God and the existence of evil.

METAPHYSICS I.

(PHILOSOPHY.)

ST. MICHAEL'S COLLEGE.

HONOUR.

Examiner—F. D. MEADER, B.A.

1. (a) Define Cosmology. Explain and justify your definition.

(b) What are the relations between cosmology and the physical sciences?

2. (a) Outline the chief theories which attempt to explain the origin of the world.

(b) Refute materialistic monism.

3. Show how the mechanical theory of matter is incompatible with the results in the following departments of physical research:

(a) Chemistry - The atomic weights.

(b) Physics (i) The Kinetic Theory of Gases.

(ii) The Law of Gravitation.

4. (a) State the Thomistic Theory of Matter and Form explaining fully the terms "materia prima" and "substantial form".

(b) Discuss (i) The reality and (ii) The evolution of "materia prima".

5. Explain the role played by the substantial form in the constitution of bodies.

6. Discuss the relations between the chief properties of bodies and the corporeal substance.

7. Show the inadequacy of the various scientific definitions of "mass". Give and justify the philosophical definition of "mass."

8. Refute the dynamism of Kant.

ETHICS.

(PHILOSOPHY)

ST. MICHAEL'S COLLEGE.

HONOUR.

Examiner—REV. N. ROCHE.

1. Define the Individual's duties as determined by the Natural Law (1) towards himself: (2) towards Society.

2. No lie can be lawful nor innocent and no motive can excuse a lie because a lie is always bad in itself.

3. Discuss the various theories of the origin of the right of private property.

4. Outline the constitution of civil Society based upon its origin in the natural law.

5. Criticize the basis of the Socialistic Theory. Show that it is impracticable and suggest some other solution for the social problems of the time.

6. Outline the true relation that should exist between the church and the state.

7. Determine the relative position of the rights enjoyed by the parent and the state in the education of the child.

8. Examine the matrimonial contract viewed as an institution founded in the law of nature.

HISTORY OF PHILOSOPHY.

ST. MICHAEL'S COLLEGE.

HONOUR.

Examiner—J. J. PURCELL, J.C.B., S.T.L.

1. State the predominant feature of the three great divisions of Modern Philosophy.

2. Discuss the nature and influence of the Humanists.

3. Discuss Descartes under the following heads: (a) Epistemology, (b) Philosophy of Nature, (c) Ethical doctrines.

4. Outline the nature and causes of the Idealistic Movement.

5. State Hume's analysis of mind and causation.

4. Hegel:

(a) "Being is becoming, development. The contradiction inherent in being is the principle or impulsive force of development. Being, self-expansion, and self-concentration, constitute the unchanging stages in the process. Quality, quantity, measure; essence and phenomenon, substantiality and causality, reciprocal action; subjectivity, objectivity, absolute: these are serial stages of being"—Weber. Explain.

(b) In Hegel's system note the function of art, religion, Philosophy.

ELEMENTARY ASTRONOMY.

GENERAL—THIRD AND FOURTH.

Examiner—C. A. CHANT.

1. Explain, using a diagram in each case, the meaning of the following phenomena:—

May 12, 10 p.m. Conjunction of Mars and Neptune,
Mars $2^{\circ} 9' N$.

May 13, 3 a.m. Mercury at greatest elongation W.,
 $26^{\circ} 3'$.

May 14, 12 noon Conjunction of Saturn and sun.

May 15, 5.45 p.m. Conjunction of Venus and moon,
Venus $3^{\circ} 11' S$.

May 16, 5.13 p.m. New moon.

May 17, 4.35 p.m. Minimum of Algol.

May 19, 11.36 a.m. Moon in perigee.

May 23, 2 a.m. Mercury at greatest hel. lat. S.

2. The following heliocentric longitudes are obtained from the *Nautical Almanac* for 1912:—

	Mercury ○	Venus ○	Earth ○
Aug. 14.....	301	168	321
Aug. 22.....	329	..	329
Sept. 1.....	15	..	339
Sept. 7.....	49	..	164
Oct. 4.....	192	..	192

Draw a diagram as accurately as possible to illustrate the meaning of these figures, and state what phenomenon occurs at each of the dates given.

3. Explain the terms: *Transit* (of a star), *Meridian*, *First of Aries*, *Right Ascension*, *Declination*, *Ecliptic*, *Equation of Time*.

Find approximately the R.A. of the sun on May 14.

4. On March 18, 1912, the moon was new, and it was observed that during the following week the crescent was so turned that it could 'hold water.' Explain this phenomenon.

5. Explain why the stars appear to cross the sky during the night, and also why the stars seen in the summer are not the same as those seen in the winter.

6. Describe the sun, naming its chief parts (photosphere, &c.) and explain each.

7. Describe the planet Saturn.

8. Explain how the distances of the stars are determined.

8. Describe how the stars are divided into constellations, and explain how those in any constellation are designate

Sketch as fully as you can one constellation.

ASTRONOMY.

HONOUR

Examiner—C. A. CHANT.

1. Define *obliquity of the ecliptic, sidereal noon, zenith, prime vertical, hour angle.*

Where and at what time of the year would you look for Fomalhaut (R. A. 22 h. 51 m., Decl.—30° 16')?

2. Prove that the radius of the earth at sea level

$$= a \sqrt{\left(\frac{\cos \phi}{\cos (\phi - \phi') \cos \phi'} \right)},$$

where a is the equatorial radius, ϕ the geographical and ϕ' the geocentric latitude of the point of observation.

From this (or any other) formula find the radius at Toronto in metres.

3. Describe the variations in the length of the day during the year at any station, and contrast the phenomena at Toronto and at Edmonton (Lat. 52° 33' N.)

Prove that in the course of the year the sun is as long above the horizon as below it.

Why is the hottest part of the summer about August 1?

4. Obtain formulæ for determining the latitude and longitude of a star when its right ascension and declination are given.

5. At Toronto on May 1, 1912, the star α Boötis was observed to cross the meridian at 11.53 p.m. as indicated by an ordinary watch. Find the error of the watch.

6. Define *equation of time*, and indicate a method of computing its value.

The sun rises in Toronto on May 1 at 5.10 and sets at 7.20 (Standard Time). Explain the discrepancy in the length of the morning and afternoon, and find the equation of time for that day.

What effect would a change in the sun's declination during the day have on the result?

7. Find the formula for a sun-dial,

$$\tan\theta = \sin\phi \tan(n \times 15^\circ).$$

What will this become for a vertical dial mounted with its plane in the prime vertical?

8. From the *Almanac* find the dates of the solar eclipses of 1912. Find the interval between them, and account for its length.

Discuss the number of eclipses in a year.

9. Explain *sidereal period*, *synodic period*.

Given that the sidereal period of Mercury is 88 days and that of the earth is $365\frac{1}{4}$ days, find the synodic period of Mercury.

10. The magnitude of the four components of ϵ Lyræ are 5, $6\frac{1}{2}$, 5, $5\frac{1}{2}$. Find the magnitude of the star as a whole.

If the distance of a star were increased 40 per cent. what would be the change in the numerical value of its magnitude? If the distance were diminished by 40 per cent., what change in the magnitude?

(Candidates will be allowed to use the *Nautical Almanac* and books of Mathematical Tables.)

MATHEMATICS.

(HIGHER PLANE CURVES.)

HONOUR.

Examiner—W. R. BOCKING, M.A.

1. Define trilinear co-ordinates, stating the conventions adopted.

Prove that every linear equation in trilinear co-ordinates represents a straight line.

2. Obtain the conditions that the general equation of the second degree may represent a circle. What is meant by the circular points at infinity?

3. If a hexagon be inscribed in a conic, the intersections of pairs of opposite sides lie on a straight line.

4. (a) A multiple point of order k may be regarded as the union of $\frac{1}{2}k(k-1)$ double points.

(b) A proper curve of degree n cannot have more than $\frac{1}{2}(n-1)(n-2)$ double points.

5. (a) The polar line of $(x'y'z')$ with respect to $F=0$ coincides with the polar line of any polar.

(b) If $(x' y' z')$ is an ordinary point on the curve $F=0$ then it lies also on each polar of $(x'y'z')$ with respect to $F=0$.

6. (a) Shew that the number of points of inflexion on a curve is given by the formula $i=3n(n-2)$, when there are no double points.

(b) Find what change must be made in this if there are cusps on the curve.

7. (a) Every multiple point of order k on the curve is one of order $(3k-4)$ on the Hessian.

(b) Every tangent at a multiple point on a curve is also a tangent to the Hessian at that point.

8. State Carnot's Theorem.

Use it to shew that if a triangle is circumscribed about a conic the lines joining the vertices to the opposite points of contact meet in a point.

9. (a) Prove that all conics which have the same focus have two imaginary common tangents passing through this focus, and shew that these tangents pass through the circular points at infinity.

(b) Define what is meant by the foci of a curve of degree n .

(c) If the straight line at infinity is itself a tangent to the curve, state the distribution of the foci.

THEORY OF FUNCTIONS.

HONOUR.

Examiner—ALFRED T. DELURY.

1. Outline the development of a theory of irrational numbers.

Shew that every sequence of real numbers, no one of which is greater than a certain number d , has an upper boundary. Is this boundary necessarily a *limit*?

2. Define *function of a real variable*, and *continuity* with respect to this function.

Shew that a function of a real variable, continuous within a closed interval, attains its upper limit.

Indicate the need of the qualification *closed*, and state any theorem depending directly on this theorem.

3. Shew that if the series

$$u_1(z) + u_2(z) + u_3(z) + \dots$$

where z is real, is known to be uniformly convergent in a closed interval, the sum of the series is a continuous function of z in that interval.

Is the converse true?

State the theorem, defining the terms used, for z complex.

4. The power series

$$a_1 + a_2 z + a_3 z^2 + \dots$$

has a radius of convergence R :

(a) Shew that within and on the circumference $(0; R')$ where $R' < R$, the series defines a continuous function.

(b) If $|c| < R$ obtain the power series in $z - c$ which defines this function in the neighbourhood of c .

(c) Outline the proof of the existence of at least one singularity on the circumference $(0; R)$.

5. If two power series in the same variable are equal for unlimitedly many values of the variable in every neighbourhood of a given point the two series are identically equal, *and* if two power series in $z - c_1$ and $z - c_2$ are equal for unlimitedly many values in every neighbourhood of a point z_1 , in their common domain, then the two series are equal throughout their common domain.

6. Obtain an expression for

(i) a one-valued function with its only singularity at infinity, and that a pole.

(ii) A one valued function with only one singularity and that essential and at c .

7. Obtain Weierstrass's Factor-Theorem.

8. Define, in two ways, integration in relation to that part of an analytic function given by $P(z)$, identifying these definitions.

Derive Cauchy's three integral results.

9. Assuming Laurent's expansion, discuss the behaviour of a one-valued analytic function in the neighbourhood of an isolated essential singularity.

SYSTEMS OF GEOMETRY.

HONOUR.

Examiner—ALFRED BAKER, M.A.

1. $\alpha, \frac{x\alpha + y\beta}{x+y}, \beta, \frac{x\alpha - y\beta}{x-y}$ are coterminous vectors; prove that their extremities form an harmonic range.

Shew also by vector geometry that *any* line across the pencil $\alpha, x\alpha + y\beta, \beta, x\alpha - y\beta$ is harmonically divided.

2. α, β, γ are vectors (OA, OB, OC) not in the same plane; and BC, CA, AB are divided in the ratios $q:r, r:p, p:q$ in the points D, E, F . Find the vector to the intersection of AD, BE, CF .

If FE meet BC in D' , shew that B, D, C, D' form an harmonic range.

3. Obtain the forms

$$a\beta = ab(-\cos \theta + e \sin \theta); \quad \frac{\beta}{a} = \frac{b}{a}(\cos \theta + e \sin \theta).$$

If q be the quaternion $w + xi + yj + zk$, shew that

$$\text{tensor } q = \sqrt{w^2 + x^2 + y^2 + z^2}.$$

4. Find the equation of a sphere in the form $\rho^2 - 2S\gamma\rho + \gamma^2 - a^2 = 0$; also the equation of the tangent plane at the "term" of ρ in the form $S\pi\rho - S\gamma(\pi + \rho) + \gamma^2 - a^2 = 0$.

If ρ_1, ρ_2, ρ_3 be three vectors to the sphere, prove that the tangent planes at all points on the section of the sphere by the plane $\rho = \rho_1 + x(\rho_1 - \rho_2) + y(\rho_2 - \rho_3)$, pass through the same point.

5. Obtain the equation of an ellipse in the form $S\rho\phi\rho = 1$.

Prove that as the pole travels along the line $\rho = a + x(-a + \beta)$ the polar turns about a fixed point.

6. Find the equation of the cycloid in the form $\rho = (\theta - \sin \theta)\alpha + (1 - \cos \theta)\beta$.

Prove that the normal at the point P passes through A , the point of contact of the rolling circle with the line on which it rolls.

7. In the case of motion in a central orbit shew that areas are proportional to the times of describing them;

also that the velocity varies inversely as the perpendicular from the centre of force on the tangent.

$$\text{Find the law of force in the orbit } \rho = e \cdot a \cdot \beta^{\frac{2\theta}{n\theta\pi}}.$$

8. Without appealing to metric geometry shew that any transversal across the projection of an harmonic range, is harmonically divided.

Also, being given three points A, B, C , and having constructed for the fourth harmonic point D , shew that if B, C, D are given, in constructing for the fourth harmonic point, then A is restored.

9. Given five tangents to a conic, shew how to construct any number of additional tangents.

Also, given three tangents to a conic and the points of contact on two of them, shew how to construct any number of additional tangents.

DIFFERENTIAL EQUATIONS.

HONOUR.

Examiner—J. C. FIELDS, PH.D.

1. Find an integrating factor of the equation

$$\left(6y - \frac{2y}{x} - 3\right) dx + \left(6x - \frac{2x}{y} - 3\right) dy = 0$$

which is a function of xy and integrate the equation.

Obtain the complete primitive of the equation

$$\frac{dy}{dx} + P y = Q y^n$$

where P and Q are functions of x .

2. Solve the differential equations :

$$y' - \cos x \cdot y = 2x e^{\sin x},$$

$$(x + 3y + 1) dx + (3x + y + 1) dy = 0,$$

$$p(xp - 2y) + 2(x + y) = 0.$$

3. Prove the *Existence-Theorem* for a solution of an ordinary differential equation of the first order and first degree.

4. Prove that a linear equation connects any $n+1$ integrals of the linear differential equation $F(x, D)y = 0$, of order n .

5. Obtain the generalization of the Theorem of Leibniz for $F(D)u v$.

Prove the symbolical identity

$$x^r D^r = \theta (\theta - 1) \dots (\theta - r + 1).$$

6. Integrate the equations:

$$(D - a)^k y = e^{ax},$$

$$(D^2 + 1) (D - 2) y = \cos x,$$

$$x^2 y'' + 4 x y' + 2y = 2e^{2x}.$$

7. Obtain in algebraic form the complete primitive of the differential equation

$$\sqrt{(1-y^2)(1-k^2 y^2)} dx + \sqrt{(1-x^2)(1-k^2 x^2)} dy = 0.$$

Find two integrals of Legendre's equation

$$(1-x^2) y'' - 2xy' + n(n+1)y = 0.$$

8. Shew how to solve a pair of simultaneous linear differential equations

$$\phi_1(D)y + \psi_1(D)z = X_1, \quad \phi_2(D)y + \psi_2(D)z = X_2.$$

Integrate the pair of simultaneous equations

$$y' + y + z = x, \quad z' + y + z = -x.$$

9. Integrate the partial differential equations

$$z = x p + y q + f(p, q),$$

$$z = (x + y)(p + q),$$

$$(D^2 - m^2 D'^2)^k z = 2x^2 y.$$

10. Obtain the general integral of the partial differential equation

$$(D - m_1 D' - p_1)^{k_1} (D - m_2 D' - p_2)^{k_2} z = 0.$$

Find a particular integral of the equation

$$(D - 2D' - 1)^k z = e^x (y + 2x)^2.$$

ACTUARIAL SCIENCE.

HONOUR.

Examiner—S. BEATTY.

1. (a) Shew that

$\Delta_h^n \cdot f(x) = (D_h - 1)^n \cdot f(x)$, where $f(x)$ is any polynomial in x .

(b) Defining $\left[\frac{x-a}{h} \right]_h^n$ to be

$$\frac{(x-a)(x-a-h)\dots(x-a-(n-1)h)}{h^n},$$

shew that

$$\Delta_h \left[\frac{x-a}{h} \right]_h^n = n \left[\frac{x-a}{h} \right]_h^{n+1}$$

(c) Shew that

$$f(x) = \left(1 + \Delta_h^{\frac{x-a}{h}}\right) \cdot f(a), \text{ where } f(x) \text{ is any polynomial in } x.$$

2. (a) If $\Delta_h \cdot F(x) = f(x)$, and if

$$\sum_a^{b-h} f(x) \text{ means } f(a) + f(a+h) + \dots + f(b-h),$$

shew that

$$\sum_a^{b-h} f(x) = F(b) - F(a).$$

(b) Deduce that

$$\sum_a^{b-h} \left[\frac{x-a}{h} \right]_h^n = \frac{1}{n+1} \left[\frac{b-a}{h} \right]_h^{n+1}$$

(c) Deduce that

$$\sum_a^{b-h} f(x) = \frac{(1 + \Delta_h^{\frac{b-a}{h}}) - 1}{\Delta_h} \cdot f(a), \text{ where } f(x) \text{ is any polynomial in } x.$$

(d) What are the two important special cases of this formula?

3. (a) Shew that

$$1V_x \cdot l_{x+1} = (1+i) \cdot P_x \cdot l_x - d_x,$$

$$2V_x \cdot l_{x+2} = (1+i) \cdot (P_x + 1V_x) \cdot l_{x+1} - d_{x+1},$$

.....

$$nV_x \cdot l_{x+n} = (1+i) \cdot (P_x + n-1V_x) \cdot l_{x+n-1} - d_{x+n-1}.$$

(b) Deduce that

$$\begin{aligned} {}_nV_x &= A_{x+n} - P_x(1 + a_{x+n}), \\ &= \frac{a_x - a_{x+n}}{1 + a_x}, \\ &= \frac{A_{x+n} - A_x}{1 - A_x}, \\ &= \frac{P_{x+n} - P_x}{d + P_{x+n}}. \end{aligned}$$

(c) Give *verbal* interpretations for any *two* of these *four* formulae.

4. (a) If V_{10} and V_{11} represent a company's total net reserves on Dec. 31st, 1910 and 1911 respectively calculated at rate i , if the total amount paid out as claims during the intervening year is C , if the total amount received as net premiums during the year is P , and if j is the rate of interest earned by the company, shew that

$$\begin{aligned} &V_{10}(1+i) + (P-C)\left(1 + \frac{i}{2}\right) - V_{11} \text{ and} \\ &\left(V_{10} + \frac{P-C}{2}\right)(j-i) \end{aligned}$$

represent approximately the profits from *mortality* and *interest* respectively.

(b) Arrive at similar approximations to the *mortality* and *interest* profits for the $(n+1)$ 'th policy year, in the case of a whole-life policy taken out at age x and remaining in force for $(n+1)$ years at least.

5. (a) Why is it necessary to graduate mortality tables?

(b) State some of the advantages and disadvantages of each of the three methods of graduation.

(c) How would you actually form a mortality table based on the formula

$$l_x = k \cdot s^x \cdot g^c$$

where s , g , c are known constants?

6. (a) Describe Pell's method of finding the mortality at young ages, stating what his data was and the sources of it.

(b) What is the difference between Pell's method and the London Life method?

7. (a) Define *aggregate* table, *select* table, *ultimate* table.

(b) How would you form an *aggregate* table giving the experience of a company for the years 1902–1911 inclusive? Use the policy-year method, taking nearest ages at entry, nearest durations at maturity or withdrawal, exact durations at existing, and curtate durations at death.

8. (a) Suppose (x) has a sum of 1 coming in every year after the death of (y). A purchaser buys this *apportionable* life interest to realise i_1 on his investment while (y) is alive and i_2 on his investment while (x) only is alive. What is the price?

(b) Find the value of a *contingent reversion* of 1 to (x) after the death of (y) where the purchaser wishes to realise i on his investment.

PROBABILITY.

HONOUR.

Examiner—S. BEATTY.

1. (a) If p is the probability of an event happening in a single trial, what probabilities are denoted by

$$\binom{n}{r} p^r (1-p)^{n-r} \text{ and } \sum_{s=r}^n \binom{n}{s} p^s (1-p)^{n-s} \quad ?$$

(b) Shew that these expressions can be put in the symbolic forms

$$\frac{z^r}{(1+z)^{r+1}} \text{ and } \frac{z^r}{(1+z)^r} \text{ respectively.}$$

Explain what z^s means.

(c) What are the meanings to be attached to

$$\frac{z^r}{(1+z)^{r+1}} \text{ and } \frac{z^r}{(1+z)^r}$$

in case we are considering n independent events whose probabilities of happening are respectively $p_1, p_2, p_3, \dots, p_n$?

2. (a) A solid with f plane faces on which are the numbers m_1, m_2, \dots, m_f , is thrown on the table n times. If the chances of these faces turning up in a single throw are respectively p_1, p_2, \dots, p_f , shew that the *chance* that the sum of the numbers turned up in n throws is exactly m is the coefficient of x^m in

$$\left\{ p_1 x^{m_1} + p_2 x^{m_2} + \dots + p_f x^{m_f} \right\}^n.$$

(b) What is the value of this probability in the case of an ordinary die where $n=5$ and $m=10$?

3. A point P is taken in a line AB of length l ; $p+q$ other points are chosen at random in this line; p of these lie in the line AP and q in the line PB . Shew that the chance that

$$a l < AP < \beta l \text{ is } \frac{\binom{p+q+1}{p} \binom{p+q+1}{q}}{\binom{p+q+1}{p} \binom{p+q+1}{q}} \int_a^\beta x^p \cdot (1-x)^q \cdot dx$$

4. (a) The floor is covered with parallel lines a apart. A straight stick of length a is thrown on the floor. The chance that the stick cuts at least one of the lines is given by p where p equals

$$\frac{2a}{\pi}, \frac{2}{\pi}, \frac{2}{\pi} \{a + \sec^{-1} a - \sqrt{a^2 - 1}\},$$

according as $a < 1$, $a = 1$, $a > 1$. Prove this.

(b) Shew by a diagram the connection between the variables p and a . Do $\frac{dp}{da}$ and $\frac{d^2p}{da^2}$ exist at the point $a=1$?

5. (a) Two points P and Q are taken at random in a triangle. Shew that the chance that PQ cuts a particular pair of the sides of the triangle is $\frac{1}{3}$.

(b) If the points P and Q are taken at random in a parallelogram, shew that the chance that PQ cuts a particular pair of *adjacent* sides is $\frac{1}{2}$, while the chance that PQ cuts a particular pair of *opposite* sides is $\frac{1}{3}$.

6. Shew by general reasoning the correctness of the formulae:

$$1 = i a_x + (1+i)A_x = (d + P_x)(1 + a_x)$$

$$P_x = \frac{A_x}{1+a_x} = \frac{d A_x}{1-A_x}$$

$$a_x = v p_x (1 + a_{x+1})$$

$$A_x = v(q_x + p_x A_{x+1})$$

7. Derive and explain the use of the formulae:

$$n+1 V_x = 1 - \frac{1}{p_{x+n}} \{1 - (1+i)(n V_x + P_x)\},$$

$$n V_x = 1 - \frac{1 + a_{x+n}}{1 + a_x} = 1 - \frac{1 - A_{x+n}}{1 - A_x}$$

8. There are 44 policies of 1 each, all effected at age 40, which have been in force 1, 2, 3...etc., up to 44 years respectively. The sum of the policies values which is

$$\sum_{n=1}^{44} [A_{40+n} - P_{40} (1 + a_{40+n})] \text{ equals } 17.52789,$$

and $A_{40} = .37943$. Find the values of $\sum_{n=1}^{44} A_{40+n}$

and $\sum_{n=1}^{44} P_{40} (1 + a_{40+n})$.

PROBLEMS.

Examiners—THE EXAMINERS IN MATHEMATICS.

NOTE.—Candidates are requested to return answers to questions 1 to 3, I to III, A and B , a b c d , α and δ in separate books endorsed accordingly.

1. By vector geometry find the locus of a point P which moves so that the sum of the projections of OP on the straight lines OA , OB , OC is constant.

2. Find the loci represented by the following equations:

$$S \frac{\rho}{a} = 1; \quad TV \frac{\rho}{a} = TV \frac{\beta}{a}.$$

3. Given four points A , P , B , A_1 on a straight line, construct for two additional points Q , B_1 , such that A , P , B , Q form an harmonic range, and also P , A_1 , Q , B_1 an harmonic range.

I. Find the complete primitive of the differential equation

$$(D - x^{-1})^n y = 0.$$

II. Solve the differential equation

$$x^2 p + f(y + x p) = 0.$$

III. Integrate the partial differential equation

$$p^2 - 4 q^2 = (x + y)^2.$$

A. Find the Hessian of the curve

$$x^3 - 3 a xy + y^3 = 0,$$

and hence make a statement as to its points of inflexion.

B. Examine the same curve with regard to the number of its foci. State how many are real and how many are maginary.

a. If

$$a_0 + a_1 + a_2 + a_3 + \dots$$

is a series of positive terms, and if the limit of the ratio $a_{n+1} : a_n$ exists; or, if the limit of the n th root of a_n exists, find for what values of x in each case the series

$$a_0 + a_1 x + a_2 x^2 + a_3 x^3 + \dots$$

is convergent, and shew that the two limits in question must be equal.

b. Obtain the general expression for an integral analytic function without finite zeros.

c. At a certain place a star rises when its hour angle is h : it crosses the meridian when its altitude is a . Find the latitude of the place.

d. Shew that the time when the sun is south-east may be determined by means of the expression

$$\frac{1}{15} \left\{ \theta - \sin^{-1} (\cos \theta \sin \phi \tan \delta) \right\},$$

when δ is the sun's north declination, ϕ is the latitude of the place, and $\tan \theta = \sin \phi$.

a. Of n independent events the chance that the first *only* should happen is a_1 , the chance that the second *only* should happen is a_2 , etc., and finally the chance that the last *only* should happen is a_n . Shew that the chances of these independent events happening are respectively

$$\frac{a_1}{a_1 + x}, \frac{a_2}{a_2 + x}, \dots, \frac{a_n}{a_n + x},$$

where x is a root of the equation

$$(a_1 + x)(a_2 + x)\dots(a_n + x) = x^{n-1}.$$

\beta. The straight line DE cuts the sides AB and AC of the triangle ABC in D and E respectively. The probability that the area of the triangle ADE is less than r times that of the triangle ABC , where r is a proper fraction, is $r(1 - \log r)$. Prove this.

γ. If $f(x)$ is a *quadratic* expression in x , shew that

$$\int_a^\beta f(x) dx = \frac{\beta - a}{6} \left\{ f(a) + 4 f\left(\frac{a + \beta}{2}\right) + f(\beta) \right\} .$$

Shew that this formula if applied to

$$\int_0^{\frac{\pi}{2}} \sin x dx , \text{ gives a good approximation.}$$

What is the general use made of such formulae in actuarial science?

δ. Shew if $t > n$, that

$${}_nV_{x|t} = \frac{P_{x|t} - P'_{x|n}}{P'_{x|n}}$$

and explain the result verbally.

LEAST SQUARES.

HONOUR.

Examiner—W. J. LOUDON.

1. Two points are taken at random on the circumference of a circle of radius a , Find the average length of the chord.
2. Obtain the equation of the probability curve and trace it.
3. Define *probable error*, and obtain its theoretical value in terms of the constant of the probability curve.
4. Distinguish between the probable error of a single observation and the probable error of the arithmetic mean and find the relation between them.
5. Find the law of probability of error in the case of a linear function of observed quantities.
6. If a quantity be a non linear function of measured quantities, shew how to find its probable error.
The adjacent sides of a rectangle are measured and their probable errors determined: find the probable error of the area.

7. If a number of observation equations be given greater than the number of unknown quantities, shew how to form the normal equations. Measurements of the ordinates of a straight line corresponding to the abscissae 4, 6, 8, 9, gave the values 5, 8, 10, 12. Find the most probable equation of the straight line.

8. The angles of a plane triangle are measured independently and are found to be:

$A \pm r_1; B \pm r_2; C \pm r_3,$
 where $A + B + C = 180^\circ + d$: find the adjusted values of the angles.

CELESTIAL MECHANICS.

HONOUR.

Examiner—ALICE BALL.

1. Two planets move subject only to their mutual attractions. Shew that their centre of gravity moves in a straight line with uniform velocity.

2. Define mean, true, and eccentric anomalies and shew that $M = E - e \sin E$.

3. Shew that the time in an hyperbolic orbit is given by

$$\frac{(t - t_0) \sqrt{\mu}}{(-a)^{\frac{3}{2}}} = \frac{e}{2} \left(u - \frac{1}{u} \right) - \log_e u$$

where $u = \tan \left\{ \frac{F}{2} + 45^\circ \right\}$ and $\tan \frac{1}{2} F = \sqrt{\frac{e - 1}{e + 1}}$
 $\tan \frac{1}{2} v$.

4. Prove Lambert's theorem:—If t be the time of describing any arc PP' of an elliptic orbit, and K be the chord of the arc, then

$$nt = (\phi - \sin \phi) - (\phi^1 - \sin \phi^1)$$

$$\text{where } \sin \frac{1}{2} \phi = \frac{1}{2} \sqrt{\frac{r + r^1 + K}{a}}$$

$$\sin \frac{1}{2} \phi^1 = \frac{1}{2} \sqrt{\frac{r + r^1 - K}{a}}$$

5. Shew that the centre of gravity of the earth and moon describes an orbit relatively to the sun very nearly in one plane.

6. Shew that the differential equations of the motion of the moon may be reduced to the following:—

$$\frac{d^2 u}{d\theta^2} + u = \frac{P}{h^2 u^2} - \frac{T}{h^2 u^3} \frac{du}{d\theta} - 2 \left[\frac{d^2 u}{d\theta^2} + u \right] \int \frac{T}{h^2 u^3} d\theta.$$

$$\frac{d^2 s}{d\theta^2} + s = \frac{P \cdot s - S}{h^2 u^3} - \frac{T}{h^2 u^3} \frac{ds}{d\theta} - 2 \left[\frac{d^2 s}{d\theta^2} + s \right] \int \frac{T}{h^2 u^3} d\theta.$$

$$\frac{dt}{d\theta} = \frac{1}{h u^2} \left(1 + 2 \int \frac{T}{h^2 u^3} d\theta \right)^{-\frac{1}{2}}.$$

7. Solve the equations given above to the first order, explaining the physical meaning of the results. Explain also the physical meaning of the Reduction in the value for the moon's longitude expressed by the term

$$- \frac{1}{4} K^2 \sin 2 (g p t - \gamma).$$

8. Prove that the orbit of the moon is every where concave to the sun.

ASTROPHYSICS.

HONOUR.

Examiner—C. A. CHANT.

1. Give a short account of the work of Fraunhofer, Kirchhoff and Huggins, explaining the importance of these names in the history of spectroscopy.

2. Prove that the dispersion of a prism

$$\frac{d\theta}{d\lambda} = \frac{2 \sin A/2}{\sqrt{1 - \mu \sin^2 A/2}} \times - \frac{c}{(\lambda - \lambda_0)^2}.$$

Being given a sample of glass, briefly explain how you would determine the angular separation of wave-lengths 1 Angström apart which would be produced by a three-prism spectroscope constructed from it.

3. What is meant by *resolving power*?

Show that it depends upon the wave-length of the radiation; and calculate the minimum aperture of a telescope to resolve stars 1'' apart.

Show that in a grating the resolving power is proportional to the entire width of the grating.

4. Explain the nature of the Zeeman effect, and give an account of the application of it in solar investigation.

5. What evidence does the spectroscope offer regarding the nature of (1) the chromosphere, (2) the corona, (3) nebulae?

6. Outline the method of classifying the stars according to their spectra, and give a physical interpretation of their meaning.

7. Show that the total radiation per unit area of a flat 'black' surface

$$R = \pi \int_0^{\infty} e_{\lambda} d\lambda.$$

8. Show that the pressure of a beam of light upon a perfectly reflecting mirror = $2E$, where E is the energy per unit volume of the incident beam.

Compare the pressure due to light with the pull due to gravitation, and give an astronomical application.

9. Obtain Wien's 'Displacement' Law, and explain how it is applied to determine the temperature of the sun.

PHYSICS.

ELECTRICAL DISCHARGE THROUGH GASES.

HONOUR.

Examiner—J. C. McLENNAN.

1. In what ways can gaseous ions be generated?

What differences distinguish a positive from a negative ion?

What is meant by the mobility of an ion?

Describe a method of measuring the mobility of a gaseous ion in air at pressures lower than atmospheric.

How does the mobility of a gaseous ion vary with the pressure?

2. How has the charge on a gaseous ion been measured? Describe the method in detail.

Shew how this quantity, if known, leads forthwith to the determination of the number of molecules in a cubic centimetre of a gas.

3. By means of the electron theory shew that $(K - 1)/d$ should be constant for a gas where K is the dielectric constant and d its density.

How would you determine the refractive index of a gas?

4. Explain with theory what is meant by the Zeeman effect.

Describe the different experimental arrangements which may be used to measure it.

5. Give an account of the nature of electromagnetic waves and any means of producing and detecting them.

From the equations of the electromagnetic field deduce the velocity of propagation of plane electromagnetic waves through free ether.

Shew that this velocity is equal to the ratio of the electromagnetic to the electrostatic unit charge.

6. Shew that an electrified sphere with mass m , radius a , charge e and moving with velocity v through a medium of magnetic permeability μ , has kinetic energy

$$\frac{1}{2} \left(m + \frac{2}{3} \frac{\mu e^2}{a} \right) v^2$$

Shew that the mean pressure exerted by a beam of light of 1 sq. cm. cross section on an absorbing wall is equal to the average energy per cubic centimetre in the beam.

7. On the assumption that all the mass of an electron is electromagnetic shew how an estimate of its size has been ascertained.

What light does this estimate throw on the question of the concentration of the ether?

8. Establish Maxwell's equations for the propagation of an electromagnetic disturbance in an isotropic dielectric.

9. Explain and establish the dispersion formulae

$$\mu^2 = K + \sum \frac{M_m}{\lambda^2 - \lambda_m^2}$$

Shew that this reduces to Cauchy's formula when the regions of resonance are far removed in the violet.

ELECTRICITY AND MAGNETISM.

(PHYSICS)

HONOUR.

Examiner—J. C. McLENNAN.

1. Define line of force and tube of force.

Explain how an electrostatic field near charged bodies may be represented by lines or tubes of force.

Shew that the mechanical force acting outward on unit area of a charged conductor is $K \frac{R^2}{8\pi}$ where R is the electric intensity at a point just outside the surface and K is the specific inductive capacity of the surrounding medium.

2. What is an electrical condenser? Express the energy of a charged condenser in terms of the charge on one of the plates and the difference of potential between the plates.

Find in terms of the initial energy of the condenser, the work done by the electric forces and the change in the energy of a parallel plate condenser when the distance between the plates is halved. (a) when the charges are kept constant. (b) when the potentials of the plate are kept constant.

3. In the ballistic D'Arsonval galvanometer prove that the quantity of electricity which produces an undamped throw θ is equal to the steady current producing the deflection θ multiplied by $\frac{T}{2\pi}$, T being the period of free oscillation of the coil.

4. Shew that the mechanical force acting on a body carrying a charge e moving with velocity v at right angles to a magnetic field H is Hev in a direction at right angles to v and H .

Explain how by means of this result together with the effect of an electrostatic field on the moving charge the value of v and of e/m can be found where m is the mass of the charged body.

5. Explain what is meant by (1) the coefficient of self induction of a circuit and (2) the coefficient of mutual induction of two circuits.

Compare the unit of self induction in the absolute electrostatic system with that in the absolute electromagnetic system and with that in the practical electromagnetic system.

What are the dimensions of self induction in the electrostatic system?

6. If a constant electromotive force E , be applied to a circuit of self induction E and resistance R find the value of the current at any time during the variable period.

Hence deduce the work done in establishing the magnetic field for such a circuit.

7. If an electrical condenser of capacity C be discharged through a circuit of resistance R and self induction L shew that the period of oscillation if there is one is given by

$$T = \frac{2\pi}{\sqrt{\frac{1}{LC} - \frac{R^2}{4L^2}}}$$

8. If an alternating electromotive force be applied to a circuit of resistance R , capacity C and self induction L , shew how to determine an expression for the current at any instant.

What is the condition for resonance?

Describe an experimental method of illustrating the phenomenon of electrical resonance.

LIGHT.

PHYSICS.

HONOUR.

Examiner—L. GILCHRIST.

1. Obtain the analytical expression for a simple harmonic vibration and its propagation.

Obtain the expression for the propagation of a group wave and for the velocity of propagation.

2. (a) Give Huyghen's principle.

What was Fresnel's extension of the principle? By means of this extension find the light disturbance at a point P due to a source of light at a point Q .

What is the effect of introducing (1) a circular screen (2) a screen with a circular opening?

Criticise the principle and the extension as an explanation of light phenomena.

3. (a) Distinguish the diffraction phenomena of Fresnel from that of Fraunhofer.

In the case of the latter

$$I = \frac{I^1}{\sigma^2} (C^2 + S^2).$$

where σ = area of the opening in screen in the X, Y plane.

$$C = \int \cos (ux + vy) d\sigma$$

$$S = \int \sin (ux + vy) d\sigma$$

$$u = \frac{2\pi}{\lambda} (\alpha_1 + \alpha_0) \quad v = \frac{2\pi}{\lambda} (\beta_1 + \beta_0)$$

$\alpha_1 \beta_1$ are the direction cosines of the normal to the incident wave.

$\alpha_0 \beta_0$ are the direction cosines of the normal to the diffracted wave.

If a rectangular opening is used and the light is incident perpendicular to the screen, obtain the expression for the intensity at any point in the focal plane of a telescope set for observation.

(b) Assume the expression for the intensity in the case of the plane transmission grating,

$$I = I' \left(\frac{\sin \frac{ua}{2}}{\frac{ua}{2}} \right)^2 \left(\frac{\sin \frac{m u d}{2}}{\sin \frac{ud}{2}} \right)^2$$

Discuss the position and intensity of all the maxima and minima formed and obtain an expression for the resolving power.

(c) Deduce the results for the plane reflection grating for different methods of mounting.

4. (a) Give the construction, theory, and method of adjustment of the Michelson interferometer. Obtain an expression for the form of the images.

Describe an example of its use in research work.

(b) Describe the Fabry and Perot interferometer. Obtain an expression for its resolving power.

5. Discuss the investigations that have been made on the "ether drift."

6. Outline the development of the relationships that have been shown to exist between the lines of a spectrum.

ASTROPHYSICS.

LIGHT.

HONOUR.

Examiner—L. GILCHRIST.

1. (a) Obtain the analytical expressions for a simple harmonic vibration and its propagation.

(b) Sum analytically

$$S_1 = a \sin 2\pi \left(\frac{t}{T} - \frac{x}{\lambda} \right)$$

$$S_2 = \frac{a}{4} \cos 2\pi \left(\frac{t}{T} - \frac{x}{\lambda} \right)$$

2. (a) Give an account of the development of the theories of propagation of light.

Point out any deficiencies in the theories and shew how their development illustrates the advantages and disadvantages which may arise from a theory.

3. (a) What was Young's method of obtaining interference? Shew how the method may be used to obtain the wave length of light.

(b) Describe the Fresnel mirror interferometer.

Determine the wave length of light from the following measurements.

Distance of source from line of junction of the mirrors = 1 metre.

Distance of screen from the same line = 2 metres.

Angle between mirrors = $\frac{10}{\pi}$ minutes.

Distance between fringes = 1 mm.

4. Give the construction and theory of the Michelson interferometer.

Shew how it has been used to measure. (a) the standard metre; (b) the thickness of a soap film; (c) the index of refraction and dispersion of a piece of glass.

5. (a) Give the method of visibility for the determination in a double source of the distance between the components, the "half width" of each component, and the ratio of the intensities of the components.

(b) Shew how visibility has been used to determine the temperature in a Geissler tube containing Hydrogen during an electrical discharge.

6. (a) Describe the Lummer-Gehrcke interferometer. The expression for the intensity of the transmitted light is

$$I = I_0 \frac{(1 - \tau)^2}{(1 - \tau)^2 + 4 \tau \sin^2 \frac{\pi \gamma}{\lambda}}$$

where I_0 = the intensity of the incident light.

$\sqrt{\tau}$ = coefficient of reflection at an air-glass surface.

λ = wave length of light.

γ = the path difference between successively transmitted rays after multiple reflection.

Indicate graphically the distribution of intensity for various values of τ and values of $\frac{\pi \gamma}{\lambda}$ from 0° to 90° .

(b) Obtain expressions for

(1) Use in the measurement of the wave length of light.

(2) the change in wave length corresponding to a shift in the fringes.

(3) the resolving power of the instrument.

7. Calculate the thickness of a soap film (refractive index $4/3$), which, when light is incident on it at 45° gives a dark band in the reflected light whose centre is found by the spectroscope to correspond to wave length 6×10^{-5} cm.

THERMODYNAMICS.

HONOUR.

Examiners— E. F. BURTON.
V. E. POUND.

1. Define mean free path, radius of sphere of action.

Prove that if a particle move at random in a space of volume u enclosed by a surface of area S , the mean free path of the particle is given by

$$l = \frac{4u}{S}$$

2. Define the coefficient of viscosity of a gas.

Prove that the coefficient of viscosity of a gas is connected with its density, the velocity of agitation, and the mean free path of its molecules, by the relation

$$\eta = \frac{1}{3} \rho ul$$

Prove also that the thermal conductivity of a gas is given by the relation

$$L = \frac{1}{3} m n u l C_v$$

where C_v = the specific heat at constant volume.

3. Given that the mean free path of a molecule

$$l = \frac{3}{4 \pi N \sigma^2}$$

where N = number of molecules per cc.

σ = diameter of a molecule.

shew that the coefficient of viscosity and specific conductivity of a gas are independent of the pressure except at very low pressures. State why the law break down at very low pressures, and give examples.

4. Deduce van der Waals' equation expressing the behaviour of a gas with changes of volume, pressure and temperature, viz:

$$\left(p + \frac{a}{v^2} \right) (v - b) = K(1 + \alpha t)$$

Determine the critical pressure, temperature, and volume in terms of the constants of van der Waals' equation where the mass of gas is such that it occupies 1cc at 0°C and 1 atmosphere pressure. Give a method of determining the critical temperature of a gas experimentally.

5. Into what three portions may the specific heat of a substance be divided, as indicated by the equation

$$dQ = A \{ dS + dI + dw \}.$$

What is the importance of Joule's law for gases?

Outline the experimental evidence bearing on the above law.

6. Explain fully what is involved in the expression

$$\int \frac{dQ}{\theta} = 0 \quad \text{for a reversible cycle.}$$

Why may this equation be said to be the mathematical expression of the second law of thermodynamics?

7. Find the work done, the change in internal energy, the change in entropy, and the heat added during the expansion of 3.5 cubic feet of air from 200 to 90 pounds pressure (absolute). The temperature is maintained constant at 650° Fahrenheit absolute.

8. Give the temperature-entropy diagram for the change in entropy of one pound of water from 32° Fah. to various temperatures t_1, t_2, t_3 , etc. above 212° Fah.

Define water line, dry steam line, quality, lines of constant quality, the zero line.

Describe the effect of adiabatic compression of steam (1) when near the saturation point and (2) when near its liquid condition.

THERMODYNAMICS.

C. & M.

Examiner—E. F. BURTON.

1. What is the standard scale of temperature adopted by the International Commission?

Explain why the particular choices expressed in their definition were made.

Describe Kelvin's absolute Centigrade scale? What is its relation to the Centigrade scale of (1) a perfect gas thermometer; (2) a hydrogen gas thermometer?

2. Describe the Callendar Barnes experiments on the variation in the capacity for heat of water between 0°C. and 100°C.

What is the importance of such a determination?

3. What is meant by the mechanical equivalent of heat? In the C.G.S. system of units the value of the mechanical equivalent is 4.19×10^7 ergs; in the English system of units (Fah. Scale), it is 777.7 foot-pounds. Deduce one of these numbers from the other.

4. In the equation $pv = RT$, find the value of R, for 1 gram of hydrogen gas.

On the kinetic view what is the meaning of R?

The ratios of the two specific heats ($C_p : C_v$) for the following gases, are: Argon, 1.66; Hydrogen, 1.42; Carbon Dioxide, 1.26; Ethyl Alcohol 1.11. What confirmation of the kinetic theory of gases is presented by these numbers?

5. Deduce equation $pv^\gamma = k$ for adiabatic change. Determine the relative slope of the adiabatics and isothermals for a perfect gas.

Find the value of the work done in taking a mass of gas through a Carnot cycle.

6. Give a statement of the second law of thermodynamics.

How is it applied to find the efficiency of a perfectly reversible heat engine?

7. Shew that if a substance contracts on solidifying, an increase of pressure will raise the temperature of the solidifying point.

8. Explain the meaning of the expression

$$\int \frac{dQ}{T} = 0.$$

for a reversible cycle.

Why is this sometimes called the mathematical form of the second law of thermodynamics?

HYDROMECHANICS.

HONOUR.

Examiner—V. E. POUND.

1. Define continuity of motion.

Derive Euler's equations for a flow of liquid, viz:

$$\frac{D u}{D t} = X = \frac{1}{\rho} \frac{d p}{d x}, \text{ etc.}$$

Explain the notation

$$\frac{D F}{D t} = \frac{d F}{d t} + u \frac{d F}{d x} + v \frac{d F}{d y} + w \frac{d F}{d z}$$

2. Derive the equation of continuity in the form

$$\frac{1}{\rho} \frac{D \rho}{D t} + \frac{d u}{d x} + \frac{d v}{d y} + \frac{d w}{d z} = 0$$

In the case of a liquid of uniform density under the action of gravity only, rotating with constant and uniform angular velocity ω about a vertical axis, shew that the cross section of the free surface is a parabola with latus rectum

$$\frac{2g}{\omega^2}$$

Also shew that the motion will satisfy the equation of continuity. Give an experimental method of determining the speed of rotation of a liquid.

3. Define stream lines.

When the velocity flow is derivable from a velocity potential ϕ what is the condition for steady motion?

Shew that the condition of steady motion implies that the velocity components u , v , and w are constant at a point.

Prove that when the body forces acting on a fluid are derivable from a potential W and the velocities of the fluid at a point from a velocity potential ϕ

$$\int \frac{d p}{\rho} + \frac{d \phi}{d t} + \frac{1}{2} q^2 + W + c = 0$$

where c is a function of t (time) alone.

4. Deduce Bernouilli's expression for the flow of a liquid under gravity when the motion is steady from

$$\int \frac{d p}{\rho} + \frac{d \phi}{d t} + \frac{1}{2} q^2 + W + c = 0$$

By the use of Bernouilli's equation find the velocity of efflux of a liquid of uniform density flowing from a small opening under the action of gravity.

Give some examples in which Bernouilli's principle can be applied.

5. Explain the meaning of "added mass" as applied to the case of a solid moving through a liquid.

A cylinder infinitely long and of radius a is moving with constant velocity V through a perfect liquid of uniform density in a direction perpendicular to its axis. Find the "added mass."

6. Derive Lagrange's Dynamical equations of motion
$$\left(\frac{d^2x}{dt^2} - X\right)\frac{dx}{da} + \left(\frac{d^2y}{dt^2} - Y\right)\frac{dy}{da} + \left(\frac{d^2z}{dt^2} - Z\right)\frac{dz}{da} + \frac{1}{\rho}\frac{dp}{da} = 0$$
 etc

Shew also how the equation of continuity is derived, viz:

$$\rho \begin{vmatrix} \frac{dx}{da} & \frac{dx}{db} & \frac{dx}{dc} \\ \frac{dy}{da} & \frac{dy}{db} & \frac{dy}{dc} \\ \frac{dz}{da} & \frac{dz}{db} & \frac{dz}{dc} \end{vmatrix} = \rho_0$$

Discuss the difference in the Eulerian and Lagrangian point of view in deriving the different sets of dynamical equations.

ELASTICITY.

HONOUR.

Examiner—E. F. BURTON.

1. Define Young's modulus, modulus of rigidity, and bulk modulus.

Shew that they are not independent.

Outline experiments by which any two of them may be found in the case of a given material.

2. Shew that for any isotropic medium there are three planes mutually at right angles to one another such that the stresses on them are entirely normal.

3. Find the expression for the velocity of a plane wave in an infinitely extended isotropic medium in terms of the constants λ and μ .

Deduce the expression in terms of the three moduli of elasticity.

What conclusions may be drawn with respect to wave motion in solids, liquids, and gases?

Give the bearing on the theory of the constitution of the aether.

4. Define the extraordinary and ordinary indices of refraction of a double refracting crystal.

Differentiate between uniaxal and biaxal crystals.

Name the six general systems of crystals and indicate which are isotropic, which uniaxal and which biaxal.

5. Describe with diagrams two forms of prisms whereby one can obtain a large separation between the extraordinary and ordinary beams into which natural light may be broken.

6. Describe (1) a Nicol prism; (2) a Babinet compensator; (3) a polarisation microscope; (4) a saccharimeter.

7. What is the effect of inserting between crossed Nicols (1) a plate of quartz 3 cm. thick, cut perpendicular to the axis; (2) a sheet of mica about 3mms. thick.

Describe the effect, in each case, (a) of rotating the analyser; (b) of rotating the inserted section.

8. What is meant by elliptically polarised light? In what respect does it differ from (1) plane polarised light; (2) circular polarised light? How would you distinguish experimentally between the three kinds?

ANATOMY.

THIRD YEAR P. & B. AND FOURTH YEAR B. & P.

Examiner—J. PLAYFAIR McMURRICH, M.A., Ph.D.

1. Describe the development and relations of the Inguinal Canal.

2. Describe the Thoracic Duct.

3. Give the origin and insertion of the muscles forming the pelvic walls and floor.

4. Describe the arterial supply and venous drainage of the Stomach.

5. Describe the course and distribution of the Hypoglossal nerve.

6. Describe the Pericardium.

ANATOMY.

P. & B.

Examiners { J. PLAYFAIR McMURRICH, M.A., Ph.D.
 { JAMES C. WATT, B.A., M.B.

1. Describe a typical neuron. How do the spinal sensory neurons differ from the type?
2. What structures are developed from the middle primary brain vesicle?
3. Describe the ventral surface of the Medulla oblongata (Myelencephalon).
4. Describe the position of the Internal Capsule. What fibre tracts compose it and what is their distribution?
5. Describe the Lateral ventricle.
6. Locate the cortical olfactory centre. Trace the course of an olfactory stimulus from the periphery to this centre, describing the various neurones affected.

COMPARATIVE ANATOMY.

BIOLOGY.

Examiner—A. G. HUNTSMAN.

1. Compare the mammalian and avian lungs as to structure and efficiency.
2. Discuss the epidermic structures of birds.
3. Describe the stomach, liver and duodenum of the rabbit.
4. What features in the forelimb (including the girdle) of the pigeon make it useful as an organ of flight?
5. Describe the genital system of the rabbit. What are the corresponding parts (both vestigial and functional) in the two sexes?
6. Compare the pigeon with the rabbit as to the structure of the vertebral column in the region of the trunk.

COMPARATIVE NEUROLOGY.

B. AND B. & P.

Examiner—PROF. RAMSAY WRIGHT.

1. What evidence is there of segmental structure in the Vertebrate brain?
2. Describe the origin, course, and termination of the fibres of the lateral lemniscus in man.
3. Discuss the situation, form and connections of the habenular ganglia in Vertebrates.
4. Draw a transverse section through the region of the anterior commissure of a rabbit's brain, indicating the various structures met with.
5. In what respects do the cranial nerves of an aquatic vertebrate differ from those of one of the higher forms?

GENERAL BIOLOGY.

B. AND B. & P.

Examiner—PROF. RAMSAY WRIGHT.

1. What are the essential features of Patten's theory of the origin of the Vertebrates?
2. Discuss experiments in crossing various varieties of Maize.
3. Discuss secondary sexual characters in animals; what explanations have been offered of their origin?
4. What difficulties are met with if we endeavour to account by Natural Selection alone for the disappearance of vestigial organs.
5. Give some examples of sex-limited inheritance. How may these be interpreted in the light of recent cytological research?

EMBRYOLOGY.

BIOL. AND B. & P.

Examiner—W. H. PIERSOL, B.A., M.B.

A—(to be answered by both Biol. and B. & P).

1. Describe the development of the heart in mammals.
2. Describe the development of the kidney system of mammals.

B (to be answered by Biol. only).

3. Give an account of the development and fate of the skeletal structures in the visceral arches of amphibian and mammalian embryos.

4. Give a comparative account of the development of shark, amphibian, bird, and mammal up to and including the formation of the mesoderm. Illustrate your answer by diagrams.

C (to be answered by B. & P. only.)

5. Describe the formation of the placenta in the case of rabbit and human embryos.

6. Describe the development of the ear in man.

PHYSIOLOGICAL PSYCHOLOGY.

Examiner—W. G. SMITH.

N.B.—Candidates will choose between questions 1 and 2.

1. Four discs, each composed of black and white sectors, when rotated on a motor are observed to be just equally different from each other in brightness. When measured the constituents of the discs are found to be as follows:

A	90	degrees black	+270	degrees white.
B	87.25	“	+272.75	“
C	84.85	“	+275.55	“
D	81.63	“	+278.37	“

Would this be in accordance with Weber's Law?

2. Ten persons pronounce the heights of four objects to be as follows, estimated in feet:

8, 8.5, 9.5, 9, 9, 8.5, 9.5, 10, 9, 9.5,
40, 34, 36, 32, 36, 38, 36, 38, 38, 38,
19, 18, 20, 19, 17, 16, 18, 19, 17, 18,
68, 64, 72, 76, 72, 72, 76, 72, 80, 76,

What would such judgments indicate?

Subsequently a method of measuring the objects was found and the results were 9, 36, 18, 72.

What conclusions could be drawn from a calculation of the judgments made?

3. Briefly indicate the purpose of the Psychophysical Methods. Describe any difficulties which may appear to you to stand in the way of a physiological interpretation of Weber's Law.

Could the physiological data in connection with such Law be admitted under any other interpretation? What bearing would such facts as those with which the law of Weber is concerned have on the view that psychical processes are the effects of which physiological processes are the direct cause?

4. Outline and compare the colour theories of Helmholtz, Hering, and Wundt.

Critically examine them in relation to the facts of colour mixture.

How does a fundamental colour theory compare with the theory of a developed colour sense?

5. Discuss the significance of the arrangement of the rods and cones of the retina, and show the relation of retinal elements to Space Perception. How would you show that the magnitude of visual space distances depends on Kinaesthetic Sensations?

6. What are the various possibilities for combination of Binocular Images? Show that visual depth Perception depends on such combination.

7. Outline the physiological basis in support of the Resonance Hypothesis of Helmholtz, indicating how the organ of Corti may be regarded as a tone analyser.

Show the difference between pure and equal temperament in musical scales, and indicate the bearing of Direct and Indirect Clang Relation on Harmony, taking as illustrations the major and minor cord.

SCIENTIFIC FRENCH AND GERMAN.
THIRD & FOURTH YEARS—B., & B. & P.

Examiner—PROF. RAMSAY WRIGHT.

Les quelques considérations très succinctes qui précèdent suffisent à la compréhension du phénomène de l'évolution progressive des organismes vivants.

L'étude des formes fossiles découvertes dans les couches géologiques, formes toutes différentes des formes actuelles, montre que les animaux très élevés en organisation ont apparu à des dates relativement récentes. Nous comprenons donc la formation de ces espèces supérieures par une accumulation progressive de caractères acquis résultant d'adaptations individuelles à des conditions qui ont sans cesse varié; si nous possédions la collection complète des ancêtres d'un individu actuel, nous y trouverions l'histoire de la formation de son espèce, et de toutes les péripéties qu'elle a traversées *sans jamais mourir*; car, c'est là le point capital de l'histoire évolutive d'une espèce comme de l'histoire évolutive d'un individu; cette histoire évolutive *n'a jamais été interrompue par la mort*; c'est ce qui a permis à Darwin d'affirmer que les êtres actuels sont une élite, et dérivent de l'élite de chaque génération précédente, puisque tous leurs ancêtres ont vécu, au moins jusqu'à l'âge de la reproduction.

Et, de même que l'être vivant provient de l'œuf qui, *anatomiquement*, est bien plus simple que lui, de même une espèce actuelle provient d'une espèce ancestrale qui, *a tous les points de vue*, pouvait être aussi énormément moins compliquée. Ainsi, la théorie transformiste, aujourd'hui acceptée sans discussion par tous les savants, substitue au phénomène, vraiment merveilleux, de l'apparition d'un homme à la surface de la terre, le phénomène, infiniment plus simple, de l'apparition d'un protoplasma vivant, réduit à l'ensemble le plus minime de propriétés héréditaires.

On comprend néanmoins quel intérêt philosophique s'attache à cette question de l'apparition première de la vie à la surface de la terre. Les conditions thermiques de la vie prouvent d'ailleurs que la vie a apparu, car il y a eu une époque où, à cause de la température trop élevée, la vie ne pouvait exister à la surface de la Terre. Lord Kelvin a supposé qu'une cellule vivante a pu être trans-

portée ici par un bolide, mais cela ne fait que déplacer le problème, car tous les corps astronomiques ont eu une évolution analogue à celle de la Terre, et il a toujours fallu que la vie apparût quelque part. Il est plus simple d'admettre, par conséquent, qu'elle a apparu à la surface de la Terre, dans des circonstances que les savants s'efforcent de reproduire dans les laboratoires.

On croit souvent, dans le grand public, que Pasteur a démontré l'inutilité de ces efforts; c'est une erreur. Pasteur a seulement montré que, avec certaines précautions, on peut conserver, à l'abri de l'envahissement par les espèces vivantes existant actuellement, certaines substances qui peuvent leur servir de milieu nutritif; voilà tout.

Le problème de la synthèse d'un protoplasma vivant reste entier.

Hesse, Abstammungslehre und Darwinism, 2nd edition, pp. 103-104.

BIOCHEMISTRY AND FOOD CHEMISTRY.

Examiners { A. B. MACALLUM
 C. C. BENSON.

N.B.—Four questions only are to be answered.

1. Write a short essay on the chemistry of fats *or* of carbohydrates.
2. Discuss the influence of foods and of muscular work on metabolism.
3. Give a description of the experimental methods used by Pavlov in the study of gastric digestion.
4. Outline and discuss the theories of protein metabolism advanced by Pflüger, Voit and Folin.
5. Indicate the evidence which points to the synthesis of fats in the human body.
6. What are the commonly accepted standards of energy requirements? How have these standards been obtained?

PHYSIOLOGY AND BIOCHEMISTRY.

BIOCHEMISTRY I.

HONOUR.

Examiners { A. B. MACALLUM
 { R. E. GABY.

1. How is β -oxybutyric acid formed in the body? What bearing may it have upon the oxidation of fatty acids in general?

2. What do you understand by the term "deamination?" What are the chemical changes involved in the process? Discuss its bearing on the validity of the rate of urea formation being used as a measure of protein metabolism.

3. Discuss the evidence in favour of the view that proteins either during digestion or after absorption are completely hydrolysed.

4. What view is taken of the origin and significance of lactic acid found in the tissues and body fluids.

5. Discuss the "psychic" or "cortical" factor in digestion.

6. Give an account of the experiments made by Fick and Wislicenus to determine the relation of work to urea formation. What were their conclusions? What is the history of the more recent views on the subject?

BIOCHEMISTRY.

HONOUR.

Examiners— { A. B. MACALLUM.
 { R. E. GABY.
 { C. C. BENSON.

1. What is the Gibbs-Thomson principle of surface condensation?

Discuss the part it plays in the distribution of salts in living matter.

2. Give an account of the composition and characters of two ferments which have been separated in a pure form.

3. What evidence is there to show that ferments may in their operations involve reversible action?

4. Discuss the "lock and key" theory of ferment action. What is the evidence on this point?

5. Compare and contrast the action of inorganic catalyts with that of organic.

6. Discuss the influence that the composition of the diet has upon the composition of the digestive fluids.

PHYSIOLOGY—PAPER I.

P. & B.

Examiner—T. G. BRODIE.

1. Describe and discuss the experiments by which the nature of the processes occurring at the glomerulus has been examined.

2. Write a concise account of the physiology of the pituitary body.

3. Describe the neuro-muscular mechanisms of the bladder.

4. How may the velocity of the blood in a blood-vessel be recorded: (a) When the vessel can be opened. (b) When the vessel must remain intact?

PHYSIOLOGY.

PAPER II.

P. & B.

Examiner—T. G. BRODIE.

1. Write an essay upon the origin and conduction of the cardiac contraction.

2. Describe the means by which the lung ventilation is regulated when variations in external conditions occur.

3. By what experiments have the exchanges between the blood and the tissues been investigated? Give an account of the main results obtained.

4. What are the results which follow extirpation of the Pancreas? Discuss the views brought forward to explain these results.

PHYSIOLOGY.
NEUROLOGY AND SPECIAL SENSES.

P. & B.

Examiner—T. G. BRODIE.

PAPER III.

1. Discuss the cortical relations of the function of speech.
2. Discuss the evidence on which the localisation of the functions of vision, smell and hearing has been determined.
3. Write an account of the main forms of skin sensations. By what means are they tested and localised?
4. What is known of the physiology of the semicircular canals and utricle of the inner ear.

PHYSIOLOGY AND BIOCHEMISTRY.

(GENERAL KNOWLEDGE.)

Examiners—{A. B. MACALLUM.
T. G. BRODIE.

Write a disquisition on each of any three of the following topics:—

1. The Renaissance.
2. The Nebular Theory.
3. The factors in Heredity.
4. Stoicism.
5. Natural Selection.
6. The Age of Pericles.
7. The Cosmic Ether.
8. Buddha.
9. The Philosophy of the Absolute.

ORGANIC CHEMISTRY.

C. & M.

Examiner—F. B. ALLAN, M.A., PH.D.

1. Give methods of synthesis for acetyl-acetone, iso-butyric acid, trimethylene, acrylic acid, diethyl ketone, trimethyl-carbinol, tribrom-phenol (1, 2, 4, 6), α , γ -diamino-butyric acid and miazines.

2. Describe the properties of benzenesulphonic acid, desoxybenzoine, pyridine and thiophene.

3. Write a short note on:

- (a) Grignard's reaction.
- (b) Friedel and Crafts' reaction,
- (c) keten and polyketides.

4. Give in detail, the general methods for:

- (a) esterification of an organic acid,
- (b) preparation of an acid anhydride,
- (c) preparation of an acid chloride.

5. What general rules may be given as to the rate of esterification of various acids using the same alcohol and various alcohols using the same acid.

6. Discuss the formula for glucose.

7. Give a description of the differences in behaviour of the various classes of hydroxy-acids and of the various classes of keto-acids. Show how these differences in the case of the hydroxy-acids may be explained using stereochemical assumptions.

CHEMISTRY AND MINERALOGY (DIV. I.)

PHYSICAL CHEMISTRY—FIRST PAPER.

Examiner—W. LASH MILLER, Ph.D.

Tables of logarithms are supplied.

1. Define ϵ , η , p , t , μ , and shew that the condition of equilibrium at constant temperature and pressure is $d\underline{\zeta} \geq 0$.

2. Define "isolated system." Shew that for an isolated heterogeneous system at equilibrium, the potential (μ) of each component is the same in every phase.

Apply the result to the determination of the potential of a constituent of a gaseous solution; enumerate all assumptions and definitions employed.

3. Obtain the numerical value of η for one kilogram of air at 15° C and 700 mm; setting $\epsilon = 0$ and $\eta = 0$ for nitrogen and for oxygen at 0°C and 760 mm. Assume that air contains 23% of oxygen and 77% of nitrogen by weight, and that its specific heat at constant volume is 0.168.

Make a full list of all the assumptions made in the calculation.

4. Give a brief deduction of the "mass law" from carefully enumerated assumptions.

Discuss its application to the dissociation of nitrogen peroxide.

5. Bearing in mind that the principles of thermodynamics make no assumption as to the "constitution of matter," discuss the meaning of such terms as "molecular concentration," "number of molecules of the dissolved substance," etc., in thermodynamical calculations.

PHYSICAL CHEMISTRY.
CHEMISTRY AND MINERALOGY—DIV. I.
SECOND PAPER.

Examiner—W. LASH MILLER, Ph.D.

1. Define phase, component.

How many components must be adopted in the systems (a) *water, potassium nitrate*, (b) *water, bismuth nitrate*, at room temperature? Give reasons in full.

2. Define interval of transition in a three component system. In the system *A, B, water*, at 15°C, the double salt *AB* forms a trihydrate whose pure solution is stable, and a dihydrate whose stable solutions all contain excess of *A*. Shew graphically the effect of adding solid *A* or *B* respectively to a mixture of dihydrate trihydrate and the solution in equilibrium with both.

3. What are the "side lines" and "middle lines" of the triangular diagram?

Shew how the point of maximum temperature on the middle line may be found by Gibbs' extension of Clausius' equation.

In what cases may two different solutions be expected to exist in equilibrium with the same pair of solid phases?

4. Show how the ζ function may be used to obtain typical equilibrium diagrams for the systems (a) *ether, water* below 10°C , and (b) *hydrogen chloride, water* above 10°C .

5. What special features of the oceanic salt deposits rendered van't Hoff's graphic method possible?

What were the chief experimental difficulties he encountered."

HISTORY OF CHEMISTRY.

C. & M.

Examiners— $\left\{ \begin{array}{l} \text{W. R. LANG.} \\ \text{GIBBS BLACKSTOCK.} \end{array} \right.$

1. Write a short note on:

(a) The Chemical Speculations of the Ancients.

(b) The Philosopher's Stone.

2 Write short biographies of:

(a) Boyle or Dalton.

(b) Berzelius or Liebig.

3. Compare the works of Paracelsus, the founders of the Phlogiston Theory, and Lavoisier. What general trend in the development of the Science does this comparison show?

4. Sketch the development of any one of:

(a) Chemical Formulae to the Benzene Theory of Kekulé.

(b) Analytical Chemistry to the end of the Nineteenth Century.

(c) Physical Chemistry to 1870.

PHYSICAL CHEMISTRY.

P. & B.

Examiner—W. LASH MILLER, PH.D.

1. What do you understand by the statement that at 33°C and atmospheric pressure, Glauber salt ($\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$) is in equilibrium with anhydrous sodium sulphate and a solution containing 32% Na_2SO_4 and 68% water?

Represent graphically the equilibria in the system *Sodium sulphate, water* at atmospheric pressure. Discuss briefly the influence of pressure on the equilibria.

2. What is meant by saying that the osmotic pressure of a one percent sugar solution at 22°C is 532 mm?

What is the least amount of work necessary to remove six grams of water from a large amount of one percent sugar solution at 22°C?

Why does the calculation of such quantities of work figure so prominently in the theory of chemical equilibrium?

3. What are the main factors on which the rates of chemical reactions depend? Illustrate by (a) the reduction of potassium permanganate in acid solution by oxalic acid; (b) the curdling of milk by rennet; (c) the solution of a solid in water.

4. How may suspensions be distinguished optically from fluorescent solutions? How do "negative" suspensions differ from "positive"?

What part is played by absorption in the phenomena of coagulation?

5. How may the surface tension of a liquid be defined?

Describe experiments to shew that the surface layers of certain solutions differ in composition from the bulk of the liquid.

GLACIAL GEOLOGY AND PHYSIOGRAPHY.

G. & M. & FORESTERS.

Examiner—A. P. COLEMAN, M.A., Ph.D.

1. Define Kame, Esker, Drumlin and Till and discuss the manner in which they are formed. Where do examples occur in Ontario, and what relationships had they to the continental ice sheet?

2. Give a list of the Glacial and Interglacial episodes recognised in the United States. How are the different deposits to be distinguished from one another? What fossils are known from the most important interglacial period of the United States? Where should the Toronto Formation be placed in comparison to that referred to?

3. When did the more important ancient Ice Ages occur and in what parts of the world? How do they compare with the Pleistocene in severity and extent? What astronomical theories have been proposed to account for Ice Ages, and how satisfactory are they?

4. Describe various methods of determining elevations, showing their relative convenience and accuracy and the safe guards that should be observed in connection with them. How may elevations be expressed in mapping and which is the most desirable method? Why do mountains stand higher than the surrounding regions?

5. Describe the chief ways in which basins may be produced, giving where possible Canadian illustrations. Discuss the origin and age of the basins of the Great Lakes. Where do basins without outlets occur in Canada and what is the character of their waters? Mention examples of such basins in the United States.

PRE-CAMBRIAN AND MINING GEOLOGY.

G. & M. AND C. & M.

Examiner—A. P. COLEMAN, M.A., PH.D.

1. Give Dana's outline of Pre-cambrian stages in the world's history and show to what extent the known geological record favors the theoretical arrangement. Give an outline of an alternative hypothesis, and discuss its suitability to explain the facts.

2. Describe the rocks of the original Huronian region, showing their present attitudes, their relations to older rocks and the probable conditions which prevailed at the time they were laid down. Compare with them the Huronian of the Cobalt region.

3. Where are limestones found in the Canadian Pre-Cambrian and how were they formed? With what other rocks are they associated, and in what condition are these limestones now? Describe the economic relations of the limestones and show what minerals of importance are associated with them.

4. Give a description of the Helen mine, showing the character and amount of the ore, its relationship to sulphides, the rocks which enclose it, and the general features of the basin in which it occurs. What was the source of the ore and how does it compare with the ore from the Magpie mine?

5. Give an account of the Rossland region, including the general geology, the character and associations of the ore bodies, the mode by which the ores were formed and their economic importance. How do these ores compare with those of the Sudbury region as to composition and origin?

VERTEBRATE PALAEOONTOLOGY.

HONOUR.

Examiner—W. A. PARKS, PH.D.

1. State the orders of Selachii.
Point out the chief characteristics of each order.
Show how they are distributed in geological time.
2. Give an account of the geological history of the Marsupialia.
3. Write on the development of the Eutherian Mammals during the Eocene.
4. Describe the cranium of a Stegocephalian and contrast it with that of a typical Reptile.
5. State the characteristics of the Predentata (Dinosaurs). Name some forms and state their geological age.

ECONOMIC GEOLOGY.

Examiner—W. A. PARKS, PH.D.

1. Give a brief account of the geology of Nova Scotia. State the chief economic mineral products and the formation from which each is derived.
2. Erzgebirge Tin Deposits:
 - (a) Outline the general geology of the region.
 - (b) Name the associated minerals.
 - (c) Describe a typical deposit at Zinnwald.
3. What are the chief graphite-producing localities of the world? Where is graphite now produced in Canada? Describe a typical Canadian occurrence.
4. How may the iron ores be classified according to origin? Describe briefly an example of each type.
5. Distinguish between the different green stones sold under the name "emerald."
State localities and describe the manner of occurrence of each type.

METEOROLOGY.

Examiner—ALEX. MCLEAN, B.A.

1. Make a sketch map of the globe showing the position of the isothermal lines for February.

Account for their position and their deflections from the parallels of latitude.

2. Draw a comparison between the daily and yearly variations in temperature under oceanic and continental conditions. State the underlying causes of these differences.

3. Describe and account for day and night breezes in mountainous regions.

4. Under normal conditions in spring and early autumn the tops of hills are less subject to frost than the neighboring valleys. Explain.

5. Describe the climate of the east and west continental coasts in the different zones.

6. State the general criteria on which is based the determination of climate in geological time

Discuss the relative value of the different criteria.

SCIENTIFIC FRENCH AND GERMAN.

C. & M. AND G. & M.

W. A. PARKS.

Examiners—FRANK B. KENRICK.

Candidates will translate Section I and any two of the remaining Sections.

I.

Les grandeurs que nous avons étudiées jusqu'ici ont une existence objective, et sont des fonctions de l'espace, du temps et de la matière ou de l'énergie; en photométrie, un élément subjectif s'ajoute aux précédents pour déterminer la valeur des quantités que l'on veut exprimer. L'énergie dans le spectre a une existence réelle, et peut être représentée par une fonction d'une certaine variable, la longueur d'onde l ou une de ses fonctions; mais, en photométrie, cette énergie est appréciée au moyen d'une unité qui est elle-même une fonction assez mal définie de l , la sensibilité d'un œil normal. En adoptant pour cette dernière une forme dé-

terminée, on peut calculer *a priori* la valeur photométrique d'une radiation, c'est-à-dire son intensité optique. Mais, au lieu de procéder par synthèse, on préfère déterminer directement, par l'expérience, cette intensité en comparant la lumière à étudier à une lumière prise comme étalon. L'étalon, qui définit l'unité, dépend ici de propriétés très complexes de la matière.

La plupart des corps, soumis à une élévation convenable de température, passent brusquement de l'état solide à l'état liquide, sans présenter, d'une manière sensible, les états intermédiaires. La température, que marque le thermomètre en contact avec les points qui sont actuellement en fusion est, pour chaque corps, pour chaque espèce chimique, une température déterminée, invariable sous la même pression: on la nomme *température de fusion*. Elle a un tel caractère de constance qu'elle permet de reconnaître la pureté d'une substance.

Les divers corps présentent, au point de vue de leur température de fusion, des différences très marquées. On peut dire que, si on les rangeait en série continue, selon leur plus grande facilité à se convertir en liquide, on parcourrait, en suivant leurs points de fusion, tous les degrés de l'échelle thermométrique.

Les phénomènes, observés depuis longtemps, les résultats nouveaux qui viennent d'être présentés, montrent que les substances qui résistent à la fusion sont de moins en moins nombreuses, à mesure qu'on perfectionne les moyens de produire des températures très élevées. Aussi, quoique la science ne puisse pas, aujourd'hui, amener tous les corps à l'état liquide, on n'en a pas, moins le droit de conclure qu'il n'est pas de corps absolument réfractaire: il n'en est aucun qui, porté à une température suffisamment haute, ne soit susceptible de fondre.

II.

Si au commencement du présent article je me suis écarté du véritable objet de la discussion et si je me suis étendu sur les phénomènes d'érosion, je l'ai fait avec l'intention de démontrer que cette érosion a fait disparaître une énorme pression et aussi une énorme température pendant l'existence desquelles a eu lieu la formation des filons d'étain.

Nous avons sommairement décrit cette méthode du magasin, dans le cas où la traversée du gîte perpendiculairement aux épontes n'est pas trop considérable et ne dépasse pas 100 mètres.

Der Tremolit unserer Albit-Epidotklüfte ist ausser in den erwähnten Einschlüssen auch selbständig in ausgedehnten haarförmigen und büscheligen Aggregaten ausgeschieden und überzieht sowohl den Albit als auch den Epitot, was auf eine Rekurrenz auch dieses Minerals hinweist, das sowohl dem Vorläuferstadium als auch dem Endstadium angehört.

Man wird mir vielleicht entgegenhalten, dass man in Verbindung mit den genannten Gesteinen Andalusit als Kontaktmineral nicht kennt; das ist vollkommen richtig, aber ich meine auch nicht, dass diese Gesteine die Kontaktmetamorphose bewirkt hätten, sondern der viel tiefer liegende Herd, aus dem sie stammen.

Die Farbe der frischen Krystalle ist weingelb, grünlichgelb. Die Kryställchen sind durchscheinend bis durchsichtig und besitzen auf ihren Flächen einen starken Glasglanz. Viele Krystalle sehen schwarz undurchsichtig aus. Beim Zerschlagen sind sie im Innern wie die ganz frischen, nur eine äusserste dünne Schicht ist durch Oxydation des Eisens schwarz undurchsichtig geworden.

III.

Die Wasserdünste, welche durch die Sonnenwärme in den Luftkreis unseres Planeten emporgehoben werden, repräsentieren eine jährliche Wassermenge von über 1000 geogr. Kubikmeilen. Als Regen, Tau und Schnee schlagen sie sich auf der Oberfläche der Erde nieder. Diese enthalten etwas Kohlensäure, namentlich aber Sauerstoff und Stickstoff, welche sie aus der Atmosphäre absorbiert haben; und ihnen, wenigstens den beiden erstgenannten, verdanken die Wasser einen grossen Teil ihrer Zersetzungs- und Auflösungsfähigkeit. Ihr Kohlensäuregehalt ist ursprünglich ein ausserordentlich geringer (etwa 2.5 Procent der absorbierten Luft), trotzdem aber durch Kalkwasser selbst im Schnee nachweisbar. Er wird jedoch bedeutend vermehrt, sobald die Wasser in die an verwesenden vegetabilischen Resten reiche obere Schicht der Erde dringen, wo sie die durch Fäulnis der organischen Substanzen entstehende Kohlensäure aufnehmen. Endlich kann sich das Wasser mit der Kohlensäure sättigen, welche aus dem Inneren der Erde emporsteigt, und welcher dasselbe auf dem Wege nach der Tiefe begegnet. Ausser Sauerstoff, Stickstoff und Kohlensäure führt das Sickerwasser von der Erdoberfläche organische Substanzen mit sich in die Erdteufe, wo sie u.a. infolge ihrer reducier-

enden Einwirkung auf die Oxyde ein wichtiges Element in dem durch circulierende Gewässer ins Werk gesetzten Umwandlungsprocesse der Gesteine bilden. In solcher Gestalt, beladen mit Sauerstoff, Kohlensäure und organischen Verbindungen, namentlich Humussäuren, ist das Wasser ein geologisches Werkzeug, dessen zersetzendem und auflösendem Einflusse keine Felsart im Laufe der Zeit widersteht. Beim Eindringen in die Gesteine verbraucht das Sickerwasser bald seinen Sauerstoff und die Kohlensäure, falls in den Gesteinen Körper vorhanden sind, welche Verbindungen mit diesen Gasen eingehen können.

IV.

Das Mangan bildet mit Sauerstoff zwei verschiedene Jonen von der Formel MnO_4 , die beide gleich zusammengesetzt sind, und sich nur durch ihre verschiedene Werthigkeit unterscheiden: das eine ist ein-, das andere zweiwerthig. Trotz der gleichen Zusammensetzung haben sie sehr verschiedene Eigenschaften; das einwerthige Jon MnO_4 ist intensiv roth gefärbt und schliesst sich in seinem Verhalten dem Jon der Ueberchlorsäure an, während das andere ebenso intensiv grün ist und Analogie mit der Schwefelsäure hat. Das zweiwerthige MnO_4 ist nur in alkalisch reagierenden Flüssigkeiten beständig; in sauren geht es in das einwerthige über. Da hierbei die Hälfte der Wasserstoffjonen verschwinden muss, so wird der dazu erforderliche Sauerstoff von einem anderen Theil der Verbindung hergenommen, der dadurch zu Manganhyperoxyd reducirt wird.

Die Löslichkeit der in Wasser unlöslichen Schwefelmetallen in Säuren beruht auf dem die Dissociation zurückdrängenden Einflusse, den letztere auf den Schwefelwasserstoff haben, und ist daher ihrer Stärke oder Dissociation proportional. Ebenso nimmt sie mit der Concentration der Säuren zu. Beide Umstände lassen sich in den einen Ausdruck zusammenfassen, dass die lösende Wirkung der Concentration der Wasserstoffjonen in der Lösung proportional ist. Durch die Vermehrung der Wasserstoffjonen werden die Schwefeljonen vermindert, und es muss zur Herstellung des Gleichgewichts festes Sulfid in Lösung gehen.

V.

Bei den vorigen Fällen wurde angenommen, dass eine kontinuierliche Mischungsreihe im festen Zustande auftrat; jetzt behandeln wir den Fall, dass darin eine

Lücke auftritt. Wahrscheinlich ist, dass nach Analogie der flüssigen Mischungen, die nicht in allen Verhältnissen stabil sind, in solchem Falle die Kurve eine Gestalt hat, wie durch Fig. 6 angedeutet wird, und wie sie auch Herr van Rijn van Alkemade angenommen hat.

Für die Bestimmung des Verlaufs der Erstarrungskurve flüssiger homogener Mischungen, wenn die feste Mischungsreihe eine Lücke darbietet, muss nun wieder die Verschiebung der beiden Kurven für flüssige und für feste Mischung betrachtet werden. Daraus ergibt sich, dass zwei sehr verschiedene Haupttypen möglich sind, die wir unter 4 und 5 anführen.

Nachdem wir jetzt zur Uebersicht der möglichen Erstarrungstypen bei Mischkrystallen gelangt sind, ist es nützlich, die besonderen Merkmale derselben auch im Vergleich zu anderen Erstarrungstypen zu vergleichen. Typus 1 ist mit keinem anderen zu verwechseln. Nur bei einer kontinuierlichen Mischungsreihe ist eine kontinuierliche Erstarrungskurve zu erwarten, die die Erstarrungspunkte der beiden Komponenten verbindet.

ADVANCED PETROGRAPHY.

HONOUR.

Examiner—T. L. WALKER.

1. Describe the quantitative classification of igneous rocks as suggested by Iddings. Indicate its advantages and limitations.
2. Explain how the chief optical properties of a rhombic mineral may be worked out from a series of slides in which it occurs in numerous crystal sections. Special reference to the following: pleochroism, double and single refraction, optical sign, extinction and system.
3. What is the history and character of the rocks in which each of the following minerals commonly occurs: chiastolite, chondrodite, noselite, leucite and sillimanite?
4. Mention the important determinative microscopic properties of the following minerals: quartz, labradorite, hypersthene, and muscovite.

GENERAL MINERALOGY.

HONOUR.

Examiner—T. L. WALKER.

1. Write briefly on Werner's contributions to mineralogy.
2. State the modern theory as to the internal structure of crystals. On what facts is it founded.
3. Mention the chief mineral products of value to the Romans indicating the source of each and the use to which it was put.
4. Indicate how the study of the artificial preparation of minerals and rocks may assist in the solution of geological problems.
5. Trace the development of mineralogy prior to 1800 A.D.

FOODS.

HONOUR.

Examiner—H. A. PAUL.

1. (a) Discuss the value of (1) milk, (2) eggs, (3) cereals, (4) acid beverages, in the invalid's diet.
(b) Suggest some of the simple means which may be adopted by the nurse, in order to aid in stimulating the patient's appetite.
2. For the same outlay of money, determine (showing methods of calculation), which of the following will yield the highest number of Calories, and which, the greatest amount of tissue-building material: (1) eggs, at 40c. dozen, (2) sirloin steak at 24c. lb. (3) dried beans at 10c. lb., (4) cheese at 20c. lb.
3. Work out a dinner at not more than 15c. per head, for an average family of six.
4. Outline a scheme for experimental work, on any one of the following topics:—
 - (1) Vegetable and animal gelatine.
 - (2) The Fireless Cooker.
 - (3) The efficiency of the various metals for cooking purposes.
 - (4) The causes for differences in thickening power of different starches.
 - (5) Yeast mixtures.

DIETETICS.

HONOUR.

Examiner—A. L. LAIRD.

1. Write notes on the points to be considered in planning a week's dietary. In marking a suggested menu, what would be a fair percentage to allow to each of the points mentioned?

2. Give two methods of calculating the composition and fuel value of a dietary. Discuss the advantages and disadvantages of each method.

3. Discuss the daily dietary of an adult from the standpoint of required fuel value.

4. (a) Why should cow's milk, if fed to infants, be modified? Suggest four methods of modifying it, comparing the relative value of each and giving points one should be especially careful of in the preparation.

(b) Discuss the use of prepared infant foods with that of modified milk.

5. (a) Write notes on the influence of diet on the mental, moral and physical growth of children.

(b) In several places, investigations have led to the inauguration of a school lunch. Discuss its value.

6. Suggest a day's menu (giving reasons for dishes chosen) for (a) a purin-free diet, (b) a so-called salt-free diet, (c) a person with diabetes.

WORLD HISTORY.

Examiner—W. H. PIERSOL, B.A., M.B.

1. Give a brief account of the contribution made to astronomical science by each of the following: Hipparchus, Ptolemy, Copernicus, Kepler, Newton.

2. Contrast the ideals and the conventions underlying the practice of the art of sculpture in Egypt, Greece and Rome. Outline briefly the course of the development of the art in each country.

3. Describe the architecture of a typical Roman basilica, and trace the development of the basilica into the Gothic cathedral.

4. Characterize the French painting of the sixteenth century; outline its development during the two succeeding centuries, referring to typical artists or works in illustration of the points you make.

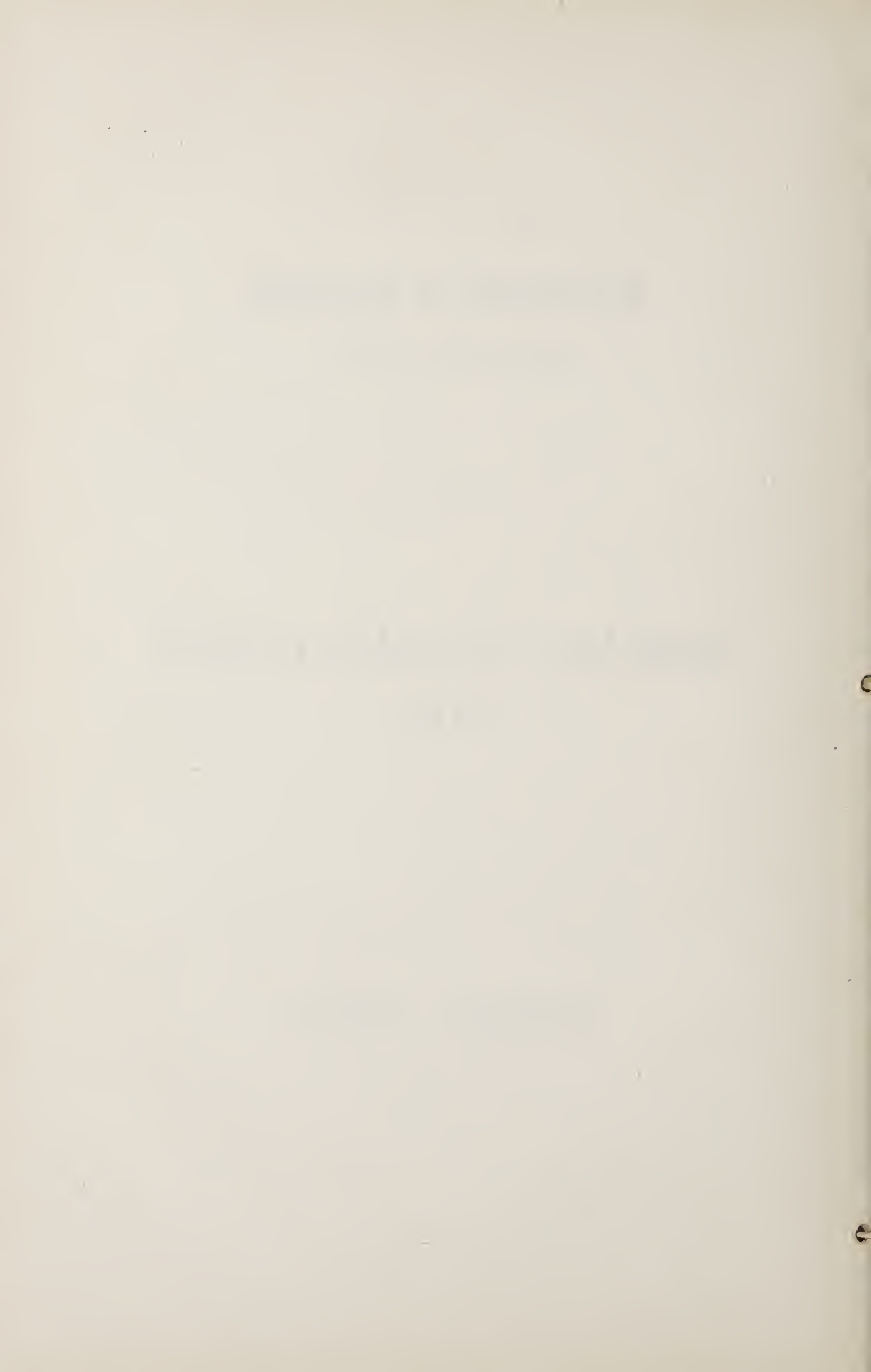
5. Characterize the art of the following painters: Rembrandt, Rubens, Ruisdeal, the Van Eycks, the Brueghels.

University of Toronto

FACULTY OF MEDICINE.

ANNUAL EXAMINATIONS
1912.

FINAL YEAR.



SURGERY.

Examiner—A. PRIMROSE, M.B., C.M., Edin.;
M.R.C.S., Eng.

NOTE—*Four questions only to be answered. The candidate must on no account answer more than four questions.*

1. In the case of a patient on whom you propose to perform an operation for resection of a malignant growth of the bowel what measures would you adopt to combat shock? Discuss this under three headings; (*a*) your treatment prior to operation. (*b*) your treatment during operation. (*c*) your treatment after operation.

2. Describe a method of skin grafting which you might employ in order to accomplish the healing of a granulating ulcer of the forearm four inches in diameter. Give the details (*a*) of the preparation of the patient prior to operation, (*b*) of the operation and (*c*) of the after treatment.

3. Tell what you know of the etiology, pathology and symptoms of "Ischaemic contraction" (Volkman) otherwise called "Ischaemic paralysis."

4. In the case of a fracture-dislocation at the level of the third lumbar vertebra causing compression of the contents of the neural canal what signs or symptoms would be produced? What treatment would you adopt and what would be your prognosis?

5. In a patient suffering from peritonitis in the right iliac region what would be the signs and symptoms? Discuss the possible causes of such a condition.

GYNAECOLOGY.

Examiner—F. W. MARLOW, M.D., C.M., F.R.C.S.

1. Menorrhagia: Define. Discuss its various causes, and indicate briefly the principles of treatment. If medicines are advised write suitable prescriptions, but omit the technique of any operations suggested.

2. Endometritis: Discuss the causes, pathology, symptoms, signs, prognosis and treatment.

3. Describe the various forms of displacement of the uterus. Relate how the position and mobility of the uterus may be altered by various conditions.

4. Name and discuss the use of the various instruments and appliances used in gynaecological examinations, mentioning any special precautions and contra-indications to be observed in their use. (This question is to be answered only by the Fourth Year of the Five Years course).

5. Describe the course of a case of pelvic inflammation, with acute origin. Discuss the diagnosis, prognosis, and treatment. (This question is to be answered only by the Fourth Year of the Four Years course.)

MEDICINE.

Examiner—W. GOLDIE, M.B.

1. Lobar Pneumonia.

Give a definition of this disease.

Give the various types of onset.

Give a list of the diseases, in order of importance, from which you must differentiate it when in the early stages of acute onset. On what signs and symptoms at this stage does the diagnosis of Acute Lobar Pneumonia depend?

How could you determine the presence of a fluid pleural exudate as it occurs over a consolidated lower lobe.

2. Give in detail the signs and symptoms of *failing* compensation of the heart.

How would your treatment of such a condition vary, where the failure occurred because of

- (a) chronic valvular affections.
- (b) coronary sclerosis.
- (c) pneumonia
- (d) influenza ?

3. Carcinoma of the Stomach.

Discuss the diagnosis of this affection from the standpoint of early diagnosis, and state the various measures you would carry out to make certain of the condition.

4. Nephritis.

Discuss the diagnosis of Inflammation of the kidney (as limited by the term "nephritis"), with reference to the differentiation from the albuminurias of other origin.

Give an outline of the treatment with your reasons for the employment of the various measures.

PATHOLOGY.

Examiners { J. J. MACKENZIE
D. A. L. GRAHAM

1. Describe in detail the macroscopic and microscopic changes found in the vessel wall in the various stages of syphilitic aortitis.

2. Describe the pathological changes found in the intestine in the various stages of typhoid fever from the time of infection until healing occurs.

3. Name and classify the benign and malignant tumours of the uterus, giving a short description with drawings of one of the malignant growths.

4. Describe the macroscopic and microscopic appearances of a kidney from a case of scarlatinal nephritis.

5. Describe the macroscopic appearances of the lung in the various stages of lobar pneumonia. Describe and give the staining and cultural characteristics of the organism most commonly found in the lung in such cases.

OPHTHALMOLOGY AND OTOLOGY.

Examiner—JAMES MACCALLUM, B.A., M.D.

1. Give the clinical history of a case of gonorrhoeal ophthalmia; treatment; prognosis.
2. A patient presents himself with an inflamed eye. How would you decide whether the inflammation was due to conjunctivitis, iritis, or glaucoma?
3. Give the clinical history of a case of acute otitis media suppurativa; treatment.
4. How would you distinguish between acute diffuse inflammation of external meatus and furunculosis?

LARYNGOLOGY AND RHINOLOGY.

Examiner—GEOFFREY BOYD, M.B.

1. Give the symptoms and treatment of ozæna.
2. Give the symptoms and diagnosis of acute maxillary sinusitis.
3. Describe the appearance of the pharynx in a unilateral peritonsillar abscess. Give briefly the treatment.
4. Left total recurrent paralysis. What is the position of the vocal cords: (*a*) during quiet respiration, (*b*) on phonation. Mention the common causes of this condition.

NOTE—Each of the above papers must be written in a separate book.

OBSTETRICS.

Examiner—KENNEDY C. MCILWRAITH M.B.

1. Discuss briefly the operation of abdominal Caesarean section with relation to its use in contracted pelvis, and describe the operation in detail.

2. Describe a method of abdominal examination of a woman at the end of pregnancy, telling what you would find in the L. O. A. and S. L. A. positions.

3. What means would you use for the elimination of toxin in a case of eclamptic toxæmia of pregnancy? Name the more urgent symptoms.

4. What influence has pregnancy, and the puerperal state on:-

(a) Mitral regurgitation?

(b) Mitral stenosis?

(c) Pulmonary tuberculosis?

5. Describe three methods of resuscitation in asphyxia of the new born.

HYGIENE AND SANITARY SCIENCE.

Examiner—JOHN A. AMYOT, M.B.

1. What are the functions of the Provincial Board of Health?

2. Tuberculosis—How is its infective agent transmitted from the sick to the well? How can this be avoided? What are the functions of the Sanatorium in this regard?

3. Describe fully one system of heating and ventilation that looks after dust, dryness, warmth, coolness and exchange of air without unpleasant draughts.

4. Point out the sanitary dangers of city milk supplies and indicate measures to correct these.

5. Describe the process of water purification by "the slow sand filtration method."

CLINICAL PSYCHIATRY.

Examiner—ERNEST JONES.

Time allowed: Three hours.

PART A.

Examine the patient allotted to you, and write a short account of those of your observations that seem to have the most diagnostic value. If possible give a diagnosis; in any case discuss the question of diagnosis. In allotting marks much more attention will be paid to your discussion than to whether the actual diagnosis given is correct or not.

PART B.

Answer the following questions, using different paper for the two parts of the examination.

1. Discuss the value in psychiatry of the word-association reaction method.
2. Describe the symptoms of the catatonic variety of dementia praecox.
3. Enumerate the physical signs of general paralysis of the insane.

PAEDIATRICS.

Examiners ALLEN BAINES, M.D.C.M.L.R.C.P. LOND.
HENRY MACHELL, M.D., L.R.C.P. LOND.

1. What are the indications for-
 - (a) Mixed feeding.
 - (b) Artificial feeding.
 - (c) Weaning.
 - (d) What percentages of fat, sugar and proteids would be appropriate for an artificially fed healthy baby of 5 months – weighing 12 lbs. and (5) caloric value of food prescribed.
2. (a) How does rheumatism of the child differ from that of the adult?
 - (b) Name the chief and minor manifestations in the child.
 - (c) Give the usual course.
 - (d) What directions would you give for the prevention of subsequent attacks.
3. Influenza—Give course, differential diagnosis, complications and sequela.
4. Cerebral Tumor:—Name varieties. Give chief classical symptoms, diagnosis, course, prognosis, treatment.
5. Empyema—causes, pathology symptoms, diagnosis, prognosis, treatment, patient three years old.

University of Toronto

FACULTY OF APPLIED SCIENCE AND ENGINEERING.

ANNUAL EXAMINATIONS
1912.

FOURTH YEAR.

1870

1871

1872

1873

1874

1875

1876

1877

1878

1879

1880

1881

1882

1883

1884

1885

1886

1887

1888

1889

1890

1891

1892

1893

1894

1895

1896

1897

1898

1899

1900

STRENGTH OF MATERIALS (4).

Examiner—P. GILLESPIE.

1. Plot a typical *load-deflection* curve for steel in cross-bending. Remark on the features of the curve and give an interpretation of the area beneath it.

2. Describe the behaviour of a steel shaft in torsion, remarking particularly on any outstanding changes in this behaviour that are observable as the test progresses. Draw a typical torque-twist curve for such a case and interpret its features.

3. A solid steel shaft 2'' in diameter is observed to twist .013 radians in a length of 120'' when a torque of 16,000 inch-pounds is applied to it. Find the Modulus of Rigidity (C) of this material.

4. A rectangular steel-concrete beam is 10'' wide and 15'' deep to centre of metal, and contains 1% of steel. If $\frac{E_s}{E_c} = n = 15$, determine the position of the neutral axis.

5. Design a longitudinally reinforced concrete column to sustain a load of 300,000 lbs., given that $c = 500$ pounds per square inch, and $n = 15$.

6. Two beams, one of steel, the other of timber are both 1'' \times 1'' in section and 30'' long. They are placed side by side and together they sustain a central weight of 320 lbs., both deflecting equally. How much of this load is sustained by each beam given that the Moduli of Elasticity of the two materials are 30,000,000 lbs. per sq. in. and 2,000,000 lbs. per sq. in. respectively.

7. A slab of reinforced concrete is to be made to bridge a span of 10'. Making the usual assumptions, design this slab so that it will be capable of sustaining safely, a uniformly distributed load, in addition to its own weight, of 150 lbs. per square foot.

8. A 24-inch I-beam weighing 80 lbs. per foot, has a span of 30'. Determine the maximum load, uniformly distributed, in addition to its own weight, which this beam can sustain without its deflection exceeding $1/360$ of the span. $I = 2087.2 \text{ ins}^4$. $E = 30,000,000$ lbs. per sq. in.

9. Discuss the effect of continuity or end restraint on beams. How are the effects of continuity recognized in the design of reinforced concrete beams?

10. Taking concrete to be worth \$8.10 per cubic yard and steel to cost 3 cents per pound, and assuming 600 and 16,000 pounds per square inch to be the safe stresses for these materials respectively in compression, compare the costs of sustaining a given load by compression members of steel and of concrete. Steel weighs 490 lbs. per cubic foot.

PROPERTIES OF MATERIALS.

Examiners— $\left\{ \begin{array}{l} \text{J. GALBRAITH, M.A.} \\ \text{P. GILLESPIE, B.A.Sc.} \end{array} \right.$

1. Explain the terms steel, wrought iron, cast iron, pig iron, malleable casting, steel casting, cast steel, blister steel, shear steel, structural steel, high speed steel, alloy steel, ferro-alloy, basic iron, foundry iron, bessemer iron—stating properties and uses and indicating the modes of manufacture.

2. Describe the basic open hearth process. What pig iron is this process designed for? Why is the percentage of carbon not specified in structural and plate steel specifications? Is this the practice in rail steel specifications? Why?

3. Describe the properties and uses of the nickel steels and other ferro-nickel alloys, giving the composition in each case.

4. Draw the temperature-composition diagram of the iron-carbon series, and explain by its aid the changes during slow cooling from the molten state down to atmospheric temperatures of (a) a structural steel, (b) a cast iron.

5. Draw a typical torque-twist curve for a steel shaft in torsion. Interpret (1) the inclination of the curve to the axis of deformation and (2) the area beneath the curve.

6. Explain the cause of the behaviour of Portland cement in each of the following instances:—

(a) Curling at edges of pat and disintegration on steaming;

(b) Constancy of volume recovered by a cement, previously unsound, after a few weeks' aeration in storage.

(c) Rapid setting.

(d) Weakness both in briquettes and pats but without the phenomena observed in (a).

7. Describe an experimental method of locating the neutral axis in a steel-concrete beam.

8. Describe the various ways in which a timber beam may fail in cross-bending. Indicate the circumstances that lead to each kind of failure.

THEORY OF CONSTRUCTION.

Examiners— $\left\{ \begin{array}{l} \text{J. MCGOWAN.} \\ \text{P. GILLESPIE.} \end{array} \right.$

1. A three-hinged parabolic arch of span 100 ft. and rise 20 ft., has a load W , 40 ft. from the left end. Find the bending moment and the direction of the curve at a point 20 ft. from the left end.

(The equation to the parabola is $y = 4h \left(\frac{x}{l} - \frac{x^2}{l^2} \right)$)

2. In an arch where bending only is considered, develop the expressions $\Sigma y \delta \phi$, $\Sigma x \delta \phi$ and $\Sigma \delta \phi$, and explain the meaning of each.

Show that at any point $\delta \phi = \frac{M \delta s}{EI}$.

3. How many conditions are required to determine the reactions for a single load on an arch without hinges? Write the three equations that are used to obtain these conditions and show briefly how they are prepared for integration.

4. Find the thrust for a rise in temperature, of an arch with two hinges.

5. If H be the horizontal tension in a cable of a suspension bridge due to the weight of the floor and the stiffening trusses, and δc be the increase in length of cable due to this load, prove

$$\delta c = \frac{Hl}{AE} \left(I + \frac{16}{3} s^2 \right)$$

where l = span, A = area of cross-section of cable, and s = sag ratio.

6. Develop the expression $\Sigma \frac{pul}{E}$ for deflection in a structure under a load.

Indicate how this is applied to find the deflection of the ends of a swing bridge when open.

7. Find the internal work due to bending in a beam, and prove this may be used to find the deflection of a beam under a central load.

8. A rectangular reinforced concrete beam $7'' \times 8''$ (to centre of metal) and containing .30 sq. ins. of steel in the cross-section, is freely supported at two points $72''$ apart. It is loaded at two points each $12''$ from mid-span, each load being 320 lbs. Careful extensometer measurements on this beam show that the neutral axis is $3.3''$ below the top of the beam, and that the strain in the plane of the metal due to these loads is .0001. Given that $E_s = 30,000,000$ lbs. per sq. in., determine with respect to these loads

(a) the maximum compressive stress in the concrete, and

(b) the portion of the moment, if any, which is resisted by the concrete in tension.

9. Establish the equation for the strength of a concrete column longitudinally reinforced. Show that the relation existing between n and c indicates that steel in columns reinforced in this manner is not in general efficiently employed.

10. Describe the effect of a *fall* in temperature on a hingeless reinforced concrete arch with rigid abutments.

HYDRAULICS

(TURBINES AND CENTRIFUGAL PUMPS).

Examiner—ROBERT W. ANGUS, B.A.Sc.

1. Give a general classification of turbines describing briefly the features of each type.

2. Find the moment produced on a turbine runner by the passage through it of a stream of water of known form.

The water at exit from the distributor guides of a 36 in. wheel has a velocity of 40 ft. per sec., θ being 30° , find the torque produced on the shaft per cubic foot per second of discharge, perpendicular off-flow being assumed.

3. Explain and illustrate the conditions affecting the form of the absolute stream-line in the runner of a turbine and discuss *fully* the proper entry and exit conditions.

Find the best number of revolutions for the turbine in question 2 if the wheel guides are normal to the circumference at entry.

4. Sketch and describe the common forms of gates used on turbines and discuss the merits of each type.

5. Prove that for turbines of a given type the characteristic is a constant. How may this characteristic be used in selecting the turbines for a given installation? Illustrate by a numerical example.

6. In a Pelton wheel show that the specific speed is approximately equal to $54 \frac{d}{D}$.

Derive formulas for the size of nozzle and the diameter of a wheel of this type to suit a given power, head and speed.

7. Explain the method of action of the turbine pump. Describe with neat sketches, two methods of balancing such pumps against end thrust.

8. A turbine pump has a 30 in. impeller, axial width 2 in. and exit angle 30° , and runs at 600 revs. per min. Against what head may this pump be expected to work when discharging 13 cu. ft. per sec., entry being assumed radial and $E = .75$?

HYDRAULICS

(GENERAL PROBLEMS)

Examiner—J. J. TRAILL, B.A.Sc.

1. Determine the time required to empty, partly or entirely, a vessel of any form by discharging water through an orifice in its base.

Compare the time required to completely empty a vertical cylindrical vessel from an initial depth H , with the time required to discharge an equal quantity of water under a constant head H .

2. Derive a formula for the discharge over a trapezoidal weir.

Explain the purpose of using such a weir as this instead of a rectangular contracted weir.

Obtain the proper value of the end slope.

3. Write notes on riveted steel water pipes, discussing the variation in the Chezy Coefficient C for these pipes.

4. In an experiment on an impulse turbine the water is measured by a weir, the head on which can be determined within .01 in. The head on the turbine can be determined within .5 ft. Find the possible per cent error in the power available when the measured head on the turbine is 150 ft. and on the weir, .20 ft.

5. Describe in detail the method of testing a reaction turbine in order that the power, efficiency and proper speed may be determined for any other conditions of Head and Gate Opening than those of the test.

6. Discuss those characteristics or rainfall, evaporation and run-off that are of importance in making estimates for water-power.

7. Describe, with diagrams, the variations in pressure due to water-hammer in a pipe.

Obtain an expression for the maximum excess pressure produced by suddenly closing a valve at the end of a pipe in which water is flowing.

8. Determine the discharge, under total head H , of a pipe carrying water to a junction with two branches which later unite and allow the whole discharge to pass through a fourth pipe; the lengths and diameters of all four pipes being known.

THERMODYNAMICS.

Examiner—L. B. TAYLOR.

1. Sketch a part of a work diagram for a gas engine where both the pressure and volume are increasing. Prove that during this change of state heat is being added. Show how you can decide whether heat is being added or subtracted during expansion in a gas engine.

2. The general polytropic expansion curve of gases has the equation $pv^m = \text{const.}$ What four well known changes of state can be derived from this equation by giving m different values. Sketch these radiating from one point in pv diagram. Give the proportion of the heat added which is converted into mechanical work during any two of these changes of state.

3. Sketch lines as they would appear in the heat (or entropy) diagram for gases representing constant volume, constant pressure, adiabatic and isothermal changes of state and indicate the areas representing the heat involved in each change.

4. Explain by a sketch of the total heat of steam (or Mollier) diagram, why in a multistage steam turbine, the steam velocities are less than in a single stage turbine working between the same pressure limits.

Show the application of this diagram when determining the moisture in steam by the throttling calorimeter.

5. Make a diagrammatic sketch of a Curtis (impulse) turbine having two double velocity pressure stages.

Name the advantages and disadvantages of this type of turbine.

Which has the greater efficiency, the high pressure or low pressure part of a Parson's turbine?

6. Make a sketch of the operating characteristics of a turbo-compressor showing the relation between the pressure produced for various deliveries and speeds.

For what purpose is the Rateau multiplier used?

7. Explain the relative merits of the pv (or work), the temp.-entropy, and the Mollier diagrams in their application to the study of heat losses in reciprocating engines and compressors, in steam turbines and in turbo-compressors.

8. Derive the equation for the theoretical pressure head in a single stage turbo-blower in terms of the known peripheral speeds, and the relative and the absolute velocities at the inner and outer diameters of impeller wheel.

HEAT ENGINES.

Examiner—L. M. ARKLEY.

1. Deduce an equation for finding the quality of steam by means of a throttling calorimeter.

Show clearly how to find graphically, on the indicator card, the quality of the steam during expansions.

2. Give a graphical method of changing a pressure volume diagram to an entropy temperature diagram. Show how to find from the entropy diagram the quantities of importance in steam engine testing.

3. Deduce expressions for the quantities of heat interchanged between the steam and the cylinder walls during admission expansion, exhaust and compression in a jacketed condensing engine.

4. Sketch a simple form of injector and explain the theory on which it operates.

Derive an expression for the theoretical quantity of water that can be delivered by an injector per pound of steam supplied.

5. Sketch and explain the operation of an ammonia compression ice-making plant.

Develop equations giving (a) the horse power of the compressor (b) the weight of cooling water required in the condenser.

6. State the relative merits of water-tube and fire-tube boilers.

In a boiler trial having given the following data:

(a) Flue gas analysis—CO₂ 12%, Co. 0.8%, O-6.2%

(b) Coal analysis—C 85%, H 5%, O-2.4%

(c) Weights of CO₂, Co, O & N respectively in pounds per cu ft. 0.123, 0.078, 0.089, 0.078.

Find (1) The weight of O per cu ft. of flue gas; (2) The weight of C per cu. ft. of flue gas; (3) The weight of air supplied per pound of fuel burned.

7. A Steam Turbine plant is to be designed to operate with superheated steam and a vacuum.

State what considerations limit the number of inches of vacuum and number of degrees of superheat to be used.

Assuming the necessary data, give method of finding the boiler horse power required for above type of plant.

PRACTICAL ASTRONOMY.

(FIRST PAPER)

Examiner—L. B. STEWART, D.T.S.

1. Describe the operation of adjusting a transit instrument approximately in the meridian, given a sidereal chronometer and a star ephemeris, the correction of the chronometer being unknown.

2. Obtain Mayer's formula for the effect of instrumental errors on the observed time of transit of a star over a given thread of a transit instrument.

3. How may the collimation and azimuth constants of a transit instrument be determined by the transits of two stars? Derive formulæ. What are the best stars to observe in order to determine the latter constant? Prove.

4. If a transit of λ Draconis ($\delta = +69^\circ - 49'$) indicates that a chronometer is $5^s.7$ slow, and a transit of β Leonis ($\delta = +15^m - 04^s$) that it is $1^s.8$ fast; find the azimuth constant of the instrument; the observed times of transit of the stars having been corrected for level and collimation. The latitude of the place is $43^\circ 40' N$.

5. Shew how a set of time observations may be reduced without Least Squares. How must the stars of the set be selected?

6. Shew how weights of observations may be applied in reducing a time set by Least Squares.

7. Given the probable errors r_1 and r_2 of the chronometer corrections ΔT_1 and ΔT^2 determined at the times T_1 and T^2 ; find the probable error and weight of the correction ΔT at the intermediate time T .

8. Sketch the necessary electrical connections for transmitting both arbitrary and chronometer signals, in determining longitude by the electric telegraph.

9. Deduce a formula for reducing an observed transit of the moon's limb over a thread of a transit instrument, to find the time of transit over the meridian.

10. At a certain place on Mar, 28th, 1912 the observed value of the moon's right ascension at culmination is $9^h 26^m 47^s.83$. Find the longitude of the place.

PRACTICAL ASTRONOMY.

(SECOND PAPER)

Examiner—L. B. STEWART, D.T.S.

1. Describe the operation of determining the angular value of a turn of the micrometer screw of a zenith telescope, by observations of a circumpolar star near elongation. Find an expression for the correction for the curvature of the path of the star.

2. Find a correction to apply to the latitude found from a pair of stars one of which was observed out of the meridian, the instrument being turned in azimuth and the star observed on the collimation axis.

3. Find an expression for the latitude, having given the times of transit of a star across a given thread of a transit instrument, adjusted approximately in the prime vertical.

4. In observing prime vertical transits for latitude the times on the first three threads were

9 h. 20 m. 47s.42

21 m. 08s.63

21 m. 30s.53,

the observations on the last two threads having been interfered with by clouds. Find the time of transit across the mean of the threads, the equatorial intervals of the omitted threads being 12s.68 and 25s.36. The latitude of the place is $43^{\circ} 40'$ N. and the declination of the star $21^{\circ} 42'$ N.

5. Derive a formula for computing the azimuth of a star in terms of its declination and hour angle and the latitude of the place. Investigate the effect of errors in the data on the azimuth.

6. Shew how the azimuth of a mark may be found by means of a transit instrument provided with a filar micrometer.

7. Find a correction to apply to the azimuth computed from the mean of the times of pointing to a circumpolar star, to find the mean azimuth.

8. Investigate the effect of diurnal aberration on the azimuth of a star.

9. Shew the effect of instrumental errors of a theodolite on an observed azimuth. How may the collimation error be determined?

GEODESY.

(FIRST PAPER)

Examiner—L. B. STEWART, D.T.S.

1. Derive expressions for the coordinates of a point on the terrestrial spheroid in terms of its geographical latitude and the elements a and e of the spheroid. Thence find the radius of the parallel of latitude of the point, and the length of the normal terminated in the axis.

2. Find expressions for the radii of curvature of the meridian, and the normal section perpendicular to the meridian, at a point in given latitude. Find the length of 1° of latitude in middle latitude $44^\circ 50'$. What is the error due to assuming the meridian arc to be a circular arc having a radius equal to the radius of curvature at its middle point?

3. A line is to be run initially due west from a point in latitude $48^\circ 35' 09''$ N. and longitude $85^\circ 16' 54''.735$, and to terminate in longitude $85^\circ 20'$; find the length of the line. If its mean height above sea-level is 1147 feet, what is its effect on the length of the line?

$$\log a \text{ (in ft.)} = \overline{7.3206875}$$

$$\log e^2 = \overline{3.8305026}$$

$$\log (1 - e^2) = \overline{1.9970504}$$

4. Write an expression for the radius of curvature of a normal section at a point, having a given azimuth, in terms of the principal radii of curvature. Thence find the mean of all the radii of curvature of normal sections at the point taken for equal indefinitely small increments of the azimuth.

5. Define *geocentric latitude* and *reduced latitude*, and shew their relations to the geographical latitude. Find an expression for the reduction of the latitude.

6. Find an expression for the area of the zone on the surface of the spheroid contained between two given parallels of latitude.

7. Shew that the spherical excess of a spheroidal triangle is equal to that of a spherical triangle whose angular points have the same latitudes and longitudes as those of the other.

8. Define the geodetic line. Shew a relation between the reduced latitude of a point on the curve and the azimuth of the curve at that point. Thence shew by means of an auxiliary spherical triangle how the azimuth of a geodetic joining two given points may be found at any point of its length.

9. At a station whose height above sea-level is 850 feet the zenith distance of another station, 38.5 miles distant, is observed to be $89^\circ 36' 48''.3$; find the height of the distant station. ($m = 0.075$; $\log \rho = 7.32071$).

GEODESY.

(SECOND PAPER)

Examiner—L. B. STEWART, D.T.S.

1. Find an expression for the difference of longitude of two points in terms of the latitude of one of them, and the length and azimuth of the line drawn from it to the other.

2. Shew the effect of the height of a station on its direction as observed from another station.

3. In a large triangle on the earth's surface give a relation between the true spherical excess and that computed on the assumption that the triangle is plane. Give expressions for the corrections to the angles to reduce them to those of a plane triangle whose sides have the same lengths as those of the given triangle.

4. Shew how a number of measured arcs of meridians and parallels may be combined in order to determine the form and dimensions of the earth.

5. Shew that the figure of the earth may be determined by means of the pendulum. Describe the use of the invariable pendulum. Find an expression for the correction for amplitude of the arc of vibration.

6. In using a reversible pendulum, if the times of vibration, when suspended in turn from the two pairs of knife edges, are not precisely equal, find an expression for the time of vibration corresponding to the length between the knife edges.

7. In the adjustment of a single triangle shew that the corrections to the angles are inversely proportional to their weights.

8. A triangulation contains the five stations A , B , C , D and E . The first four form a quadrilateral, AD being a diagonal, and station E is outside of it and nearest to station D . All the lines, except AE , are observed over, and from both ends. Give the condition equations that occur in the adjustment, and shew that the total number and the numbers of angle and side equations agree with their theoretic values.

9. Describe Bonne's projection, shewing that areas are correctly represented. What are the conditions most favourable to its use?

10. Define a loxodrome. Derive an expression for the azimuth of such a curve joining two given points on the globe.

MINERALOGY.

Examiner—T. L. WALKER.

1. The determination of minerals in thin sections is based on the following:

- Polarisation colours,
- Extinction direction,
- Pleochroism,
- Magnitude of the index of refraction.

Explain the meaning of each of these and illustrate by examples.

2. What structures and minerals are characteristic of each of the following rock types:

- Metamorphosed limestone,
- Shales altered by igneous intrusion.

3. Vesuvianite crystals exhibit the following forms: (001), (100), (110) and (111). Make a drawing shewing these forms and write the appropriate symbol on each face.

4. Write briefly on the physical conditions connected with the cementation of rocks, and the filling of fissures.

GEOLOGY.

Examiner—A. P. COLEMAN, M.A., Ph.D.

1. Describe the chief rocks of the Keewatin, eruptive as well as sedimentary. Give evidence to show whether the eruptives were deep seated or reached the surface. In what ways were the Keewatin sedimentary rocks formed? What is the relation of the Keewatin to the Huronian?

2. Where are Keweenawan rocks found in Canada? Describe the characteristic eruptives of this age and compare them with those of the Keewatin. What thickness do these rocks reach and how are they related to older rocks? Of what economic importance are they?

3. Describe the Rand gold deposits, showing their geological associations and their attitude. Discuss the origin of the gold, and compare these deposits with those of other regions as to permanence. What is the grade of the ore and what is the annual output?

4. Give an account of the Cape Breton coalfield, describing the geological succession, the enclosing rocks, and the relation of the basins to older rocks and to the sea. How does the coal compare with that of Alberta as to age and quality? How much coal does Nova Scotia produce?

5. What parts of Canada and the United States were covered by the Labrador ice sheet? What was the starting point for this sheet and what caused the ice to move so far from its center? Show the general effects of glacial work in northern and southern Ontario. What bearing has this on placer deposits?

6. Describe methods of determining directions and distances in geological field work away from surveyed territory, point out corrections necessary in these operations. What parts of the map of Canada have been made from the results of such survey work?

METALLURGY.

Examiner—H. E. T. HAULTAIN, C.E.

1. Why do we roast copper ores.
2. Discuss some important phases of reverberatory smelting.
3. Peters says,—“In pyrite smelting the degree of concentration depends chiefly upon the amount of air blown into the furnace.” Discuss this statement.
4. Outline the defects and limitations of the copper convertor.
5. Explain some of the main advantages and limitations of the use of electricity in pyrometallurgy.

MINING AND ORE-DRESSING.

Examiner—H. E. T. HAULTAIN, C.E.

(Write on questions 1 and 4 and on any two only of the other questions.)

1. Write your best on some phase of sampling.
2. Discuss the use of the various terms designating the more or less exposed parts of an ore body such as probable ore, ore in sight, etc.

3. Discuss the part played by the various technical societies in their relation to the profession.
4. Write your best on any phase of diagnosis in ore-dressing.
5. Discuss a basis for comparison of the relative efficiencies of two ore crushing methods.
6. Discuss the action of suction in the jig.

APPLIED ELECTRICITY

(FIRST PAPER)

Examiner—T. R. ROSEBRUGH, M.A.

1. Prove the truth of the usual formula for the power in a symmetrical three phase circuit.
2. Justify the use of the ordinary two-watt meter method of measuring power in a three phase circuit even when the loads are unequal and the waves not sine.
3. Give in one form Fourier's series for a periodic one valued function and show how it may be put into another form. Also give the special form commonly used in a.c. work with the reason for it.
4. Examine the question of the wave form of the current in the line in three phase transmission, the neutral not being grounded. What can be said when the neutral is grounded at both ends?
5. Find the locus of the current vector for a given voltage applied to a conductor of known reactance but variable resistance.
6. Explain how in calculations on the transformer a simple arrangement may be supposed substituted for it. Prove fully the correctness of the method.
7. In dealing with the short transmission line explain and justify the use of "the current base line."
8. In a short transmission line while the voltage is constant at one end the power factor is constant at the other. Find the corresponding locus for the "state point."

APPLIED ELECTRICITY

(SECOND PAPER)

Examiner—T. R. ROSEBRUGH, M.A.

1. Examine the case of the synchronous motor with the object of getting a measure of its stability.

2. Explain how impedance in the stator winding of an induction motor may be treated as though it were that of a short transmission line for the purpose of representing by a locus the drop in it under different amounts of slip.

3. Having given the vectors to two points show how to find an expression for the vector drawn from the same origin to a point dividing the line joining the first mentioned points in a given ratio.

4. Show how to find the square root of a complex quantity (*a*) algebraically, (*b*) by use of trigonometrical tables.

5. Sine wave voltage being suddenly applied to the terminals of an inductive resistance find the expression for the transient part of the current.

6. A conductor with resistance, inductance and capacity in series is suddenly connected to a circuit show how to proceed to find the transient part of the current.

7. Solve the problem of the direct current line with distributed leakage. Indicate briefly how the results are made use of for alternating current.

CHEMISTRY.

Examiners— $\left\{ \begin{array}{l} \text{E. G. R. ARDAGH, B.A.Sc.} \\ \text{R. B. STEWART, M.A.} \end{array} \right.$

1. Discuss the chemistry of the cyanide process for gold extraction, paying particular attention to the chemistry of cyanicides.

2. Describe in detail a method for the determination of silica in a hematite.

3. Write equations illustrating the reactions taking place in the roasting of an ore consisting principally of quartz, pyrite and chalcopyrite, and state approximately in what order these reactions occur.

4. Analysis of an ore shews— SiO_2 24.5%, Fe 29.2%, Cu 10.6%, S 30.8%. How much sulphur must be left in the roasted ore to produce a matte containing approximately 50% copper? Atomic weights—O 16, Cu 63.5, S 32, Fe 56.

5. Describe the separation and estimation of nickel in a nickeliferous pyrrhotite.

6. Explain the chemistry of any one of the wet methods for extracting silver from ores.

7. What general rules are observed in the selection of fluxes for a crucible fusion? Illustrate by calculating charge for a siliceous non-reducing ore and explaining the presence of each of the materials used.

8. Outline a wet method for the determination of silver in bullion.

9. Write notes on any one of the following: the excess litharge method; the combination method for the determination of silver in arsenical ores; the assay of zinc precipitates from the cyanide process.

10. Discuss the errors dependent on the operation of parting in the fire assay for silver and gold.

ORGANIC CHEMISTRY.

Examiner—MAITLAND C. BOSWELL, M.A., PH.D.

1. Review briefly the work done during the past two years upon the use of colloidal palladium solutions in analysis and synthesis.

2. Give a short account of the recent work of Ipatiew upon reactions at high pressures.

3. Explain the use of the Grignard reaction in synthesis. What are the laboratory conditions for carrying it out. Review the recent investigations regarding the mechanism of the formation of the magnesium alkyl halogen compound in this reaction.

4. Describe the results of recent work upon the synthesis of isoprene and its homologues, their transformation into rubber and the chemical reactions of rubber.

5. Describe briefly the research work performed this year by any other member of your year under the following heads—its object, the general method of procedure, the difficulties met and the method of overcoming them, and the results.

6. Write briefly on any one of the following—(1) Improvements in the Indigo synthesis.

(2) Fixation of labile hydrogens.

(3) The constitution or ionizing changes which accompany color changes by salt formation in the phthalin series.

INORGANIC CHEMISTRY.

Examiner—J. W. BAIN, B.A.Sc.

1. Give a short account of colloidal solutions.

2. Derive an expression for the equilibrium constant at constant pressure for the Deacon process. Describe how you would carry out experiments to test the theory, and discuss the influence of the rate of the reaction.

3. Discuss in detail the phenomena of dissociation in two component systems, selecting two cases as examples.

4. On evaporating an aqueous solution of ferric chloride, alternate solidification and liquefaction are observed. How may this be explained?

5. Discuss briefly, cryohydrate, incongruent solution, transition interval.

6. Discuss the terms "exact law" and "approximate law," illustrating by examples.

7. Describe briefly the circumstances which led to the establishment of the law of fixed ratios.

INDUSTRIAL CHEMISTRY.

Examiner—J. W. BAIN, B.A.Sc.

1. Describe the process for preparing commercial wood alcohol from the first crude distillate, indicating the by-products and their uses. Describe two processes for making acetic acid from calcium acetate. What is the method of making the edible acid?

2. Describe two typical cells for the electrolysis of alkaline chloride solutions, pointing out the favorable and unfavorable features in each.

3. Sketch (a) a column still, describing the function of each of the parts (b) a nitric acid plant, indicating the materials of construction and describing the manufacturing operations.

4. Give a brief account of the various methods of dyeing fabrics.

5. Required to make 15,000 litres of sodium sulphite solution (200 g. per l.) per 24 hours, by passing sulphur dioxide into sodium carbonate solution. With sulphur selling at \$22.50 per ton, and pyrites, 50% sulphur, at 11 c. per unit, both delivered at factory, which would you buy? What would be the daily consumption?

Assume: that pyrites can be roasted down to 2% sulphur; that a Herreshof furnace treating 3 tons pyrites per 24 hours costs \$1000, and takes 3 c. worth of power per hour; that a sulphur stove costs \$250; that there is ample dumping ground.

SANITARY CHEMISTRY.

Examiner—H. M. LANCASTER.

1. What precautions should be taken in collecting samples of water for analysis? Describe apparatus suitable for this work.

2. Outline a laboratory method for the determination of chlorine as chloride in the ordinary waters of this district. What variations in the procedure would you make, (1) for acid waters, (2) for waters very low in chloride? Discuss the sanitary significance of the results obtained.

3. What changes take place in a water during its passage through a slow sand filter? Mention some substances which have been applied as coagulants, in the clarification of water and sewage. What chemical and physical changes accompany their use?

4. Give an account of the hypochlorite treatment of water and sewage. How would you determine the available chlorine in a sample of bleaching powder?

5. Write notes on the hardness of water dealing with (a) its cause, (b) effects, (c) removal. Calculate the temporary hardness of a water from the following data: By titration, using Lacmoid as indicator, it was found that 100cc of the sample reacted with 21.6cc of N/40 Sulphuric Acid.

6. What physical and chemical changes take place in domestic sewage during its passage through (a) the ordinary septic tank, (b) the contact bed, (c) the Imhoff tank?

7. What is the general chemical composition of the pure atmosphere? Write notes on the sanitary importance of the additional constituents which may be present in the air of inhabited dwellings. Describe methods for the estimation of carbon dioxide in air. Discuss the significance of the results obtained.

SANITARY AND FORENSIC CHEMISTRY.

Examiners—W. H. ELLIS, M.A.
H. M. LANCASTER, B.A.Sc.

1. What is the chemical composition and what are the properties of the proteins.

Give examples of common food-stuffs which are rich in proteins and of others which are poor. How is the quantity of protein in a food material determined? What is the function of protein in nutrition?

2. What are the symptoms of poisoning by arsenic? Describe a method of separating, detecting and estimating arsenic in organic matter.

3. What physical and chemical changes take place in an ordinary domestic sewage during the course of decomposition under (a) aerobic, (b) anaerobic conditions?

4. What analytical processes supply data for the estimation of the organic impurities in water? Describe one of these in detail.

5. Outline a method for the accurate determination of carbon dioxide in air. Discuss the significance of the results obtained.

BACTERIOLOGY.

Examiners—J. J. MACKENZIE.
D. GRAHAM.

1. How would you determine the number of bacteria in a given sample of (a) water (b) sewage (c) milk?
2. Describe the morphological staining and cultural characteristics of bacillus coli communis.
3. How would you differentiate bacillus coli communis from bacillus typhosus?
4. Describe in detail the technique of staining according to the method of Gram. Name two Gram negative and two Gram positive microorganisms.

ELECTROCHEMISTRY.

Examiner—S. DUSHMAN, PH. D.

1. What observations are correlated by the electrolytic dissociation theory?

Calculate the osmotic pressure and boiling point of an aqueous solution containing 7.45 gms. KCl per litre.

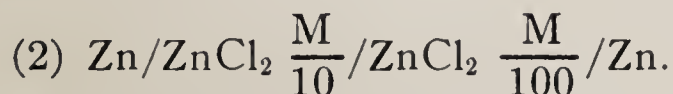
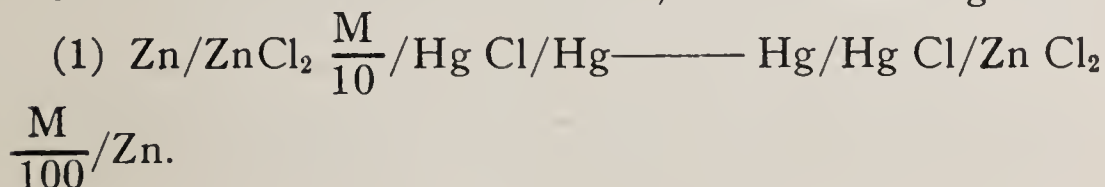
2. Deduce the relation between the "free energy" of a reaction and the thermochemically measured heat of reaction at constant volume.

The "equilibrium constant", K , of the reaction, $2\text{H}_2 + \text{O}_2 \rightleftharpoons 2\text{H}_2\text{O}$ is given by the equation

$$\log K = \frac{25050}{T} - 1.75 \log T.$$

Use this equation to calculate the e.m.f. of the oxygen-hydrogen cell at 17°C.

3. Calculate the e.m.f. at 17°C, of the following cells:



Use the tables of data to calculate the average value of α at both dilutions.

Indicate briefly how the solubility of AgCl in water may be determined by e.m.f. measurements.

4. Write a note on the Edison Battery.
Shew thermodynamically that the e.m.f. of the battery must be approximately independent of the concentration of caustic potash.

5. What is meant by the "potential" of an electrode-reaction? What use may be made of a table of potentials?
Discuss constant voltage and constant current methods of electrolytic separation and shew clearly under what conditions each is possible. Illustrate by examples.

ELECTROCHEMISTRY.

Examiner—S. DUSHMAN, PH.D.

1. Write a note on electrolytic methods for the production of caustic soda or potash.

How does the efficiency of the diaphragm cell vary with the concentration of alkali hydrate?

2. Define "thermal ohm" and "thermal mho."

Deduce the equation for the conductance of a cubical furnace.

Calculate the heat losses (in kilowatts) from a furnace made of fire brick; which is 1 metre cube inside and has a thickness of wall of 25 cms. The temperature-drop through the wall is 1500°C , and the resistivity of the fire brick may be assumed to be 100 thermal ohms per cm. cube.

3. Discuss the following statement:—

"The air space, which is advantageous in the walls of a refrigerator because the temperatures are low, is objectionable in a furnace wall because the temperatures are high."

4. Give a classification of the different types of furnaces commonly used in the electrothermic production of steel, indicating briefly the advantages and disadvantages of each type.

5. Write brief notes on the following:

(1) Design of electrodes for electric furnaces.

(2) Refractory linings for use in electric furnaces.

SANITARY ENGINEERING.

Examiner—P. GILLESPIE.

1. Define or explain: *Effective grain size, uniformity coefficient, loss of head, garbage reduction, grit chamber.*

2. Name and classify the various processes of sewage treatment.

3. Describe the construction and operation of intermittent sand filters for sewage, remarking on the conditions which would render advisable, this method of treatment.

4. Describe the Imhoff tank, showing how the objects to be accomplished are attained.

5. Explain the theory of chemical precipitation as applied to sewage.

6. Explain the principle of the automatic siphon.

7. Distinguish between the *Slow Sand* and *Mechanical* water filters indicating briefly the operation and advantages of each.

8. The flat roof of a water reservoir is divided by beams into panels 15' x 7'. Making the usual assumptions, design a reinforced concrete slab for this case which will be adequate to support (in addition to its own weight) a uniformly distributed live load of 80 pounds per square foot.

BIOLOGY.

(SANITARY ENGINEERING).

Examiners—J. H. FAULL, PH.D.

A. G. HUNTSMAN, B.A., M.B.

The answers to the last three questions are to be written in a separate book.

1. Discuss the chief ways in which an animal may affect the water in which it lives.

2. Compare as to structure and mode of life a Protozoan, e.g. *Vorticella*, with either (a) a fresh-water sponge or (b) a fresh-water Coelenterate (*Hydra*).

3. Write a general account of the way in which the Arthropods are classified.

4. Describe three types of blue green algae. Where and under what conditions do they occur?

5. Give an account of the structure, life history and economic importance of the Diatomaceae.

6. What is decay in wood? How is it effected? What factors are favorable to decay?

ARCHITECTURAL DESIGN.

Examiner—A. WELLESLEY McCONNELL, B.A.Sc.

SUBJECT: A VILLAGE SCHOOL.

This building is to be built in a small village of 1,000 population and is to be situated on a lot of 3 acres, fronted by gardens, and with playgrounds in the rear.

Required:

(a) Four class rooms with a seating capacity of 40 each.

(b) Cloak rooms.

(c) Private study for teachers with toilet, w.c., etc.

In the basement will be placed separate toilets for the sexes, with the heating and ventilating systems.

Drawings Required:

1. First floor plan—1/16" scale.

2. Second floor plan—1/16" scale.

3. Front elevation—1/8" scale.

4. Section—1/8" scale.

Working Drawings:

1. First floor plan—1/4" scale.

2. Front elevation—1/4" scale.

3. A sheet of inch scale details of main entrance.

FRENCH.

Examiner—J. SQUAIR.

I.

Translate:

Lorsque ces bulles ont cessé de se dégager, la liqueur a perdu ses couleurs, son odeur et toutes ses propriétés distinctives; ce n'est plus qu'une eau imprégnée d'acide muriatique ordinaire. La composition et la décomposition prouvent donc également que l'acide muriatique oxigéné est une simple combinaison de l'acide muriatique et de l'oxigène; mais la prompte décomposition par la lumière fait voir que l'oxigène abandonne très facilement l'acide muriatique, soit pour prendre l'état élastique, soit pour entrer dans d'autres combinaisons, et c'est de là que dépendent les propriétés caractéristiques de l'acide muriatique oxigéné.

(1) Give present indicative in full of *fait, voir, dépendent*.

II.

Translate:

La durée de l'existence de la Terre sera beaucoup plus longue—peut-être dix fois plus longue—que celle de sa période vitale humaine. Sur une dizaine de mondes pris au hasard dans l'immensité, nous pourrions, par exemple, suivant les cas, en trouver à peine un actuellement habité par une race intelligente. Les uns l'ont été jadis; d'autres le seront dans l'avenir; ceux-ci sont en préparation, ceux-là ont parcouru toutes leurs phases; ici des berceaux, là-bas des tombes; et puis, une variété infinie se révèle dans les manifestations des forces de la nature, la vie terrestre n'étant en aucune façon le type de la vie extra-terrestre. Des êtres peuvent vivre, penser, en des organisations toutes différentes de celles que vous connaissez sur votre planète. Les habitants des autres mondes n'ont ni votre forme ni vos sens. Ils sont autres.

III.

Translate:

- (1) We shall put our house on a beautiful, large lot.
- (2) It will be 60 feet (give mètres) long and 25 feet (give mètres) wide.
- (3) The architect will make plans for the house.
- (4) The masons will bring their tools and their helpers.
- (5) Carpenters do the coarse wood work, joiners the fine wood work.
- (6) The painters paint the doors and windows.
- (7) The plumbers put in the pipes and taps.

GERMAN.

Examiner—P. W. MUELLER.

Translate into English:

I.

Kobalt = Co; At.-Gew. = 59·0.

Bestimmungsformen: Co, CoSO₄.

Bestimmung als Metall.

Man erhitzt die Kobaltlösung in einer Porzellanschale zum Sieden und fällt das Kobalt als schwarzes Kobaltihydroxyd durch Zusatz von Kalilauge und Bromwasser, (filtriert,) trocknet, glüht, extrahiert nach dem Erkalten mit Wasser, um stets zurückgehaltenes Alkali zu entfernen, glüht schliesslich im Wasserstoffstrome und wägt das Metall. Nach dem Wägen löst man das Metall in Salzsäure, verdampft zur Trockene, befeuchtet die trockene Masse mit Salzsäure, fügt Wasser hinzu und filtriert die zurückbleibende Kieselsäure ab, wägt dieselbe nach dem Glühen und zieht deren Gewicht von dem durch Glühen im Wasserstoffstrome erhaltenen Reduktionsprodukt ab. Auch durch Kalilauge allein lässt sich das Kobalt fällen, aber der erhaltene Niederschlag ist nicht so leicht zu filtrieren und auszuwaschen wie das Kobaltihydroxyd. Mit Natriumkarbonat gelingt die Fällung nicht gut.

Durch Glühen der erhaltenen Oxyde des Kobalts an der Luft erhält man ein Gemisch von CoO und Co₃O₄ von wechselnder Zusammensetzung, weshalb man dasselbe zur quantitativen Bestimmung des Kobalts nicht verwerten kann.

II.

Kupfer = Cu; At.-Gew. = 63·6.

Bestimmungsformen: Kupferoxyd CuO, Kupfersulfür Cu₂S, Metall Cu, Kupferrhodanür Cu₂(CNS)₂.

1. Bestimmung als Kupferoxyd.

Die Lösung, welche frei von organischen Substanzen und Ammonsalzen sein muss, wird in einer Porzellanschale zum Sieden erhitzt und tropfenweise so lange mit reiner Kalilauge versetzt, bis der Niederschlag dunkelbraun wird und bleibt und die Lösung schwach alkalische Reaktion gegen Lackmuspapier zeigt. Nach dem Absetzen des Niederschlages giesst man die überstehende Flüssigkeit sorgfältig durch ein Filter und wäscht den Niederschlag durch Dekantation mit heissem Wasser, bis

das Wasser keine alkalische Reaktion mehr zeigt, bringt ihn dann aufs Filter und wäscht vollends aus. An der Schale bleibt meistens eine geringe Menge Kupferoxyd so fest haften, dasz es nur sehr schwer durch Reiben mittels eines mit Gummischlauch versehenen Glasstabes entfernt werden kann, und wenn es schliesslich doch gelingt, so bleibt am Gummi immer noch eine bestimmbare Menge hängen. Man verfährt daher besser wie folgt: Sobald so viel des Niederschlages wie möglich durch Ausspülen, mit der Spritzasche entfernt ist fügt man zwei Tropfen verdünnter Salpetersäure hinzu und benetzt, durch Neigen der Schale und Reiben mit dem Glasstabe, die ganze mit Kupferoxyd bedeckte Fläche damit. Zwei Tropfen der Säure genügen stets, bei richtiger Arbeit, um alles Kupferoxyd zu lösen. Nun bereitet man sich ein neues, kleines Filter vor, spült die Wandung der schiefgehaltenen Schale einmal mit heissem Wasser ab, so dasz die ganze Flüssigkeitsmenge nahe dem Ausgusse zu liegen kommt, erhitzt die immer noch schief gehaltene Schale über sehr kleinem Flämmchen zum Sieden und fällt nun tropfenweise mit Kalilauge, bis das Kupferoxyd braun fällt und so bleibt (ein groszer Überschusz an Alkali ist hiebei zu vermeiden, weil das Kupferoxyd merklich darin löslich ist). Hierauf gieszt man den ganzen Schaleninhalt rasch auf das kleine Filter und spült sofort einmal mit Wasser nach. Jetzt ist alles Kupferoxyd auf dem Filter. Man wäscht mit heissem Wasser völlig aus, trocknet beide Filter, bringt die Hauptmenge des Niederschlages in einen gewogenen Porzellantiegel, äschert die Filter in der Platinspirale ein, fügt die Asche zu der Hauptmasse und glüht zunächst gelinde im bedeckten Tiegel und hierauf mit der vollen Bunsenflamme und wägt. Bei richtiger Ausführung liefert diese Methode fast theoretische Werte; meistens sind die Resultate ein klein wenig zu hoch.

III.

Ich nahm einen geräumigen Kolben mit sehr langem Halse und bog denselben so, dass er sich nach einer Seite neigte und sein Ende die Form eines Hakens bekam. Auf diese Weise konnte die Retorte selbst in den Ofen gebracht werden, während das umgebogene Ende ihres Halses unter eine Glasglocke gestellt war, die in eine Quecksilberwanne tauchte. In den Kolben legte ich 4 Unzen sehr reines Quecksilber, dann zog ich mittelst eines Siphons aus der Glasglocke etwas Luft heraus, so dass das Quecksilber zu einer Höhe stieg, die ich durch Auf-

kleben eines Papierstreifens bezeichnete. Ich machte in diesem Moment eine genaue Beobachtung über den Stand des Barometers und des Thermometers. Nachdem auf diese Weise alles vorbereitet war, entzündete ich im Ofen ein Feuer, welches ich im Laufe von 12 Tagen immer in einer Stärke erhielt, dass das Quecksilber fast bis zum Siedepunkt erwärmt wurde. Am ersten Tage ereignete sich nichts Besonderes. Obwohl das Quecksilber nicht siedete, verdunstete es fortwährend und begann das Innere des Kolbens mit kleinen Tröpfchen zu bedecken, zuerst mit sehr kleinen, die aber mehr und mehr sich vergrösserten, bis sie schliesslich von selbst herunterfielen und sich mit der übrigen Masse von Quecksilber wieder vereinigten.

IV.

Über den Nachweis kleiner Cyanmengen in Gemischen. G. Lockemann.—Man erhitzt die mit verdünnter Schwefelsäure versetzte Substanz in einem Reagensglas, das mit einem mit Alkali getränkten Filtrierpapierstreifen bedeckt ist, bringt auf den Streifen einige Tropfen sehr verdünnter Ferrosulfatlösung, behandelt den Reaktionsfleck nach einigem Liegen an der Luft kurze Zeit mit Wasserdampf und setzt darauf konzentrierte Salzsäure hinzu; gebildetes Berlinerblau zeigt dann die Anwesenheit von Blausäure an. Zur Ausführung der Rhodanprobe betupft man den Streifen mit Polysulfid und Alkali, setzt ihn den im Reagensglas entwickelten Dämpfen aus und fügt Salzsäure und Eisenchlorid hinzu.

(Chemiker Zeitung.)

GERMAN.

Examiner—P. W. MUELLER.

Translate into English:

I.

1. Am Donnerstag Abend sind zwei prächtige Häuser in der Luifenstraße abgebrannt; aber die erschrockenen Bewohner haben glücklicher Weise ihre Bücher, Papiere, und kostbaren Gemälde durch die breiten Fenster gerettet.

2. Dieser hochmütige Mann hat arme Verwandte in der hiesigen Stadt, aber er schämt sich ihrer; daher will er sie nicht kennen und spricht nicht mit ihnen. Vor einiger Zeit hat er eine bedeutende Summe Geld geerbt, allein sie haben nichts davon bekommen.

3. Meine Tante hat dieser armen Frau ein warmes Winterkleid machen lassen, weil dieselbe so ärmlich gekleidet ist; sie wird auch der ältesten Tochter derselben wärmere Kleider machen lassen müssen, denn diese ist noch ärmllicher gekleidet als ihre Mutter.

4. Ein Hund hatte ein Stück Fleisch gestohlen und wollte mit demselben über einen Fluß schwimmen. Im Wasser bemerkte er sein Bild und hielt es für einen andern Hund mit einem Stück Fleisch. Er wünschte auch dieses zu haben und schnappte darnach; aber in einem Augenblick war sein eigenes Fleisch in dem Wasser verschwunden.

II.

1. Meine Eltern haben heute Nachmittag eine Spazierspazierfahrt nach N. gemacht; aber ich habe nicht mitfahren dürfen, weil ich heute Morgen nach der Schule eine Strafaufgabe habe schreiben müssen. Und warum hast du eine Strafaufgabe bekommen? Weil ich meine corrigierte deutsche Übersetzung nicht ohne Fehler habe sagen können. Unser Lehrer sagt uns immer: Wenn eine Aufgabe corrigiert ist, müßt ihr sie so gut lernen, daß ihr sie ohne Fehler und ohne Stocken aus dem Englischen ins Deutsche und umgekehrt aus dem Deutschen ins Englische übersetzen könnt.

2. Mein Nachbar wird sich nächstes Jahr ein großes Haus bauen und es aufs schönste und beauemste einrichten lassen. So? Gefällt ihm sein jetziges nicht mehr? Er ist ein reicher Mann geworden und will nun in einem größeren Hause wohnen; er wird sich auch einen Wagen und Pferde halten und muß sich also auch Ställe bauen lassen.

3. Dieser Palast, welcher im Jahr 1830 von dem Fürsten A. erbaut wurde, nachdem der frühere vom Feuer zerstört worden war, wird nächste Woche nebst dem schönen Park versteigert werden, da Graf B., der jetzige Besitzer desselben, sein Vermögen verspielt hat und zum armen Mann geworden ist.

III.

Herr D., den Sie ja kennen, soll große Verluste erlitten haben; er wird, wie man sagt, seine Zahlungen einstellen müssen. Es sollte mir leid thun, wenn das Gerücht wahr wäre. Hat er denn keine Freunde, die im Stande sind, ihm zu helfen? Er hätte sich in keine so gefährlichen Speculationen einlassen sollen, dann wäre es nicht so weit mit ihm gekommen. Selbst

wenn er Freunde finden sollte, die bereit wären, ihm zu helfen, so dürfte es diesen schwer werden, ihm helfen zu können. Ich möchte wissen, was er zu thun gedenkt, wenn es wirklich zu einer Zahlungseinstellung kommen sollte. Daß er doch Mittel und Wege fände, aus dieser Lage herauszukommen!

IV.

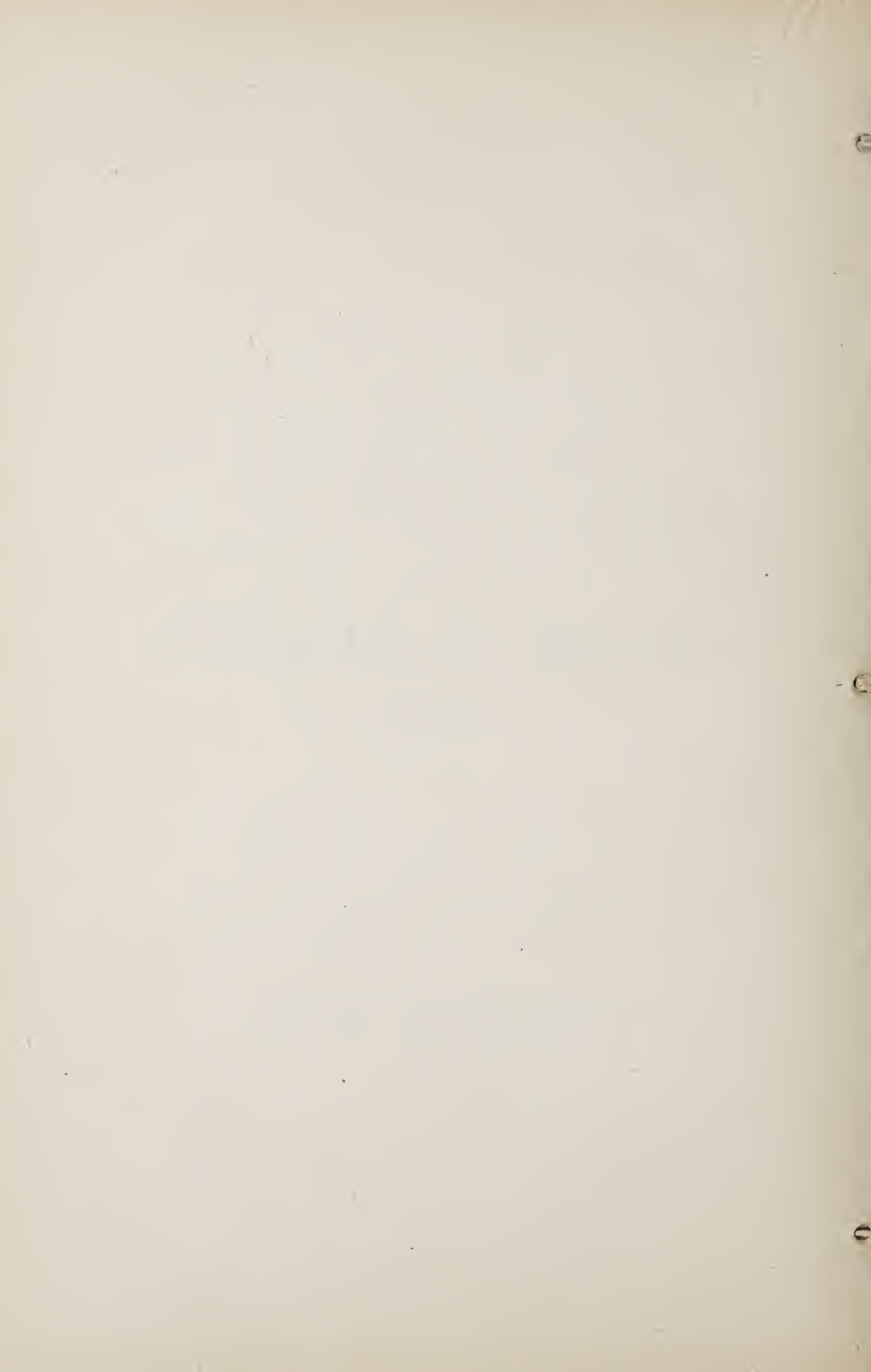
Ein Knabe, der von seinen Eltern auf einen Jahrmarkt gesandt worden war, um verschiedene Artikel zu verkaufen, wurde auf dem Heimweg von einem Räuber zu Pferd angehalten. Der Knabe lief davon, so schnell ihn seine Füße tragen konnten, wurde aber bald eingeholt. Der Räuber stieg ab und forderte das Geld des Knaben. Da zog dieser seinen Geldbeutel heraus und streute den Inhalt desselben auf dem Boden umher. Während das Geld nun von dem Räuber aufgelesen wurde, sprang der Knabe blitzschnell auf das Pferd und galoppierte davon. Zu hause angekommen, wurde das Pferd in dem Stall angebunden; darauf wurden die Satteltaschen untersucht und es fand sich außer zwei geladenen Pistolen eine bedeutende Summe bares Geld darin.

University of Toronto

FACULTY OF EDUCATION.

ANNUAL EXAMINATIONS
1912.

FOURTH YEAR.



HISTORY OF EDUCATION.

GENERAL COURSE.

Examiner—W. PAKENHAM.

(Candidates will answer any four questions.)

1. (a) Describe the training of a Roman *youth* in the early Roman period (before 250 B.C.).

(b) Estimate the effects of Greek influence upon this training in the three centuries that follow 250 B.C.

2. (a) Account for the rise of Mediaeval Universities.

(b) Describe their organization and curricula.

3. Define *Social-realism* as applied in the history of education. Illustrate social-realism by references in detail to Montaigne

or

Define *sense-realism* as applied in the history of education. Illustrate sense-realism by references in detail to Comenius.

4. (a) Define the psychological, scientific, and sociological tendencies in modern education.

(b) Indicate the relation of these tendencies to Rousseau.

(c) Illustrate the influence of the sociological tendency upon modern school curricula and school administration.

5. Sketch the progress of public education in England since 1870.

6. (a) Describe the *Common Schools* of upper Canada prior to 1840.

(b) What conditions prevented reforms?

HISTORY OF EDUCATION.

ADVANCED COURSE.

Examiner—W. PAKENHAM.

(Candidates will answer four questions.)

1. (a) Describe the training of a Roman *youth* in the early Roman period (prior to 250 B.C.).

(b) Estimate the effects of Greek upon this training in the three centuries that follow 250 B.C.

2. Describe a form of education elaborated in the middle ages for secular society as organized under the feudal system.

3. "John Locke is the great theoretical representative of the disciplinary conception of education."

(a) Define the disciplinary conception.

(b) Illustrate this conception by detailed references to Locke's *Thoughts on Education*.

(c) Estimate the influence of this conception upon subsequent educational practice in England.

4. (a) Define the psychological, scientific, and sociological tendencies in modern education.

(b) Indicate the relation of these tendencies to Rousseau.

(c) Illustrate the influence of the psychological tendency upon the school processes.

5. "Modern educational facilities in England have developed through two distinct phases: one that of schools founded from philanthropic and religious motives, and the second that of systems of public free schools established from economic and political reasons."

(a) Discuss this statement.

(b) Sketch *briefly* the development of English educational facilities through these two phases during the nineteenth century.

6. Sketch the educational history of Ontario during the last quarter century under the following heads: curricula, equipment, examinations, inspection, industrial education, training of teachers.

PRINCIPLES OF EDUCATION.

GENERAL COURSE.

Examiner—H. T. J. COLEMAN.

The candidate will answer *any five* questions.

1. State and examine Spencer's arguments in favour of physiology and psychology as fundamental studies in the curriculum.

2. "The question which we contend is of such transcendent moment is not whether such or such knowledge is of worth but what is its *relative* worth."

(a) Why is the question of relative worth so important?

(b) Outline the argument by means of which Spencer seeks to establish a standard of relative worth.

3. What arguments does Spencer advance in support of his theory that punishments should be "nothing more than the inevitable consequences of the deeds which they follow"?

To what extent is such a theory, in your opinion, applicable in school room practice?

4. Outline the reforms which Professor Dewey suggests in (a) the teaching of reading, (b) the teaching of geography.

Upon what particular facts of human nature does he base his advocacy of these reforms?

5. Discuss the doctrine of the correlation of studies:

(a) From the standpoint of the theoretical reasons advanced in its behalf.

(b) From the standpoint of its practical application in the every day work of the school-room.

6. Write notes on *any two* of the following topics:

(a) The limitations of state intervention in education,

(b) The relation between exposition and questioning as devices in teaching,

(c) The school society and its influence.

(d) Habit-formation as an element in moral and religious education.

PRINCIPLES OF EDUCATION.

ADVANCED COURSE.

Examiner—H. T. J. COLEMAN.

The candidate will answer *any five* questions.

1. "Among mental as among bodily acquisitions the ornamental comes before the useful."

(a) What illustrations from history and from contemporary life does Spencer use in support of the foregoing statement?

(b) What ambiguity is involved in Spencer's uses of the terms, 'ornamental' and 'useful'?

2. Discuss in general terms the value of Spencer's five-fold classification of studies. Contrast it with any other classification with which you are acquainted.

3. What methods does Spencer recommend in (a) the teaching of Grammar, (b) the teaching of Drawing, (c) the teaching of Geometry? Upon what general principles are these methods based?

4. What are the chief senses in which Spencer uses the term 'natural' in his statement of the theory of discipline by 'natural' consequences? Compare them with his uses of the terms 'nature' and 'natural' elsewhere.

5. Compare Spencer and Dewey as to their position in regard to *any two* of the following questions:

(a) The essential nature of morality.

(b) The chief criterion of the value of any particular study.

(c) The relation between progress as illustrated in the history of the race and progress as found in the life of the individual.

6. (a) Contrast elementary (public school) education with secondary (high school) education as to their respective aims.

(b) Discuss the advisability of the complete transference from the university to the high school of the present first year of university work.

PSYCHOLOGY AND GENERAL METHOD.

GENERAL COURSE.

Examiner—H. T. J. COLEMAN.

Candidates will answer *any five* questions.

1. (a) What is meant by the statement that ideas are frequently translations rather than reproductions of perceptions?

(b) Name and illustrate the chief memory types.

(c) In what sense is the association of ideas an illustration of the general law of habit formation?

2. (a) Explain the phenomenon of recognition in memory.

(b) Visual images are to images in general very much what words are to ideas." Explain.

(c) Should maps be the sole visual aid to students of Geography? Give reasons for your answer.

3. (a) Explain and illustrate the terms aggregate idea, judgment, concept, reasoning, as used in psychology.

(b) "Articulate speech has far outrun its primitive associate, objective gesture, in usefulness." Give reasons for this fact.

4. Write brief notes on *any three* of following topics:

(a) The concept of self.

(b) The practical utility of the aesthetic sentiments.

(c) The difficulties in the way of a fixed classification of impulses and instincts.

(d) The chief characteristics of volitional action.

5. (a) Distinguish: (i) between interests used as means in education and interests used as ends, (ii) between immediate and derived interest.

(b) Why is it a mistake to always identify the interesting with the easy?

(c) Discuss the statement, "Good teaching decides what is to be learned by an appeal, not to interest, but to the general aim of education."

6. (a) What are the chief difficulties in the way of teaching pupils to reason?

(b) State some general principles involved in the teaching of reasoning and illustrate them by reference to class room work.

7. Write at some length on *either* of the following topics:

(a) Individual differences in children and their bearing upon methods in teaching.

(b) The influence of special training upon general ability.

PSYCHOLOGY AND GENERAL METHOD.

ADVANCED COURSE.

Examiner—H. T. J. COLEMAN.

Candidates will answer *any five* questions.

1. (a) "In one sense, therefore, it is probable that no item of our lives is ever literally and entirely forgotten." What grounds are there for accepting this statement?

(b) Explain 'logical' memory as distinguished from 'rote' memory.

(c) "Forgetting is, on the whole, an added source of efficiency in our mental operations." Explain.

2. (a) Distinguish between the concept and the image.

(b) "The development of our concepts apparently proceeds along two main lines, *although the two are at the bottom really one*, first, by the creation of essentially new concepts; and second, by the enrichment of old concepts with new material."

(i) Illustrate by specific examples the two lines of development mentioned in the foregoing quotation.

(ii) Discuss the italicized statement.

3. (a) Distinguish between reflex action and instinct and show the essential relationship between the two.

(b) What are delayed instincts? What are transitory instincts?

(c) Outline in a general way the development of the instinct of imitation.

4. (a) "Every emotional reaction represents the survival of acts originally useful." On the basis of the foregoing account for the characteristic physical signs of the emotions of joy, anger, disgust, fear.

(b) Explain the general relationship between emotion on the one hand and mood, temperament and sentiment respectively on the other.

5. (a) What are the chief differences between the marginal and focal elements in consciousness?

(b) "The stage of active attention is the field in which the arts and devices of the teacher find their highest utility."

"The essence of civilization is that remote and not immediate ends govern conduct."

Discuss these statements.

6. (a) "As far as the educative process is concerned, the child is an entirely different being at different levels of his growth."

What are the 'levels' referred to and in what general respects do they differ one from another?

(b) Name the chief mental and moral characteristics of the adolescent period. What implications have these characteristics so far as the work of class instruction is concerned?

7. Write on *any two* of the following topics:

(a) The value and the limitations of the lecture method of instruction.

(b) The educative value of the formal written examination.

(c) The practical value of the Herbartian theory of the formal stages of the recitation.

SCHOOL MANAGEMENT & SCHOOL LAW.

Examiners { H. J. CRAWFORD.
 { W. PAKENHAM.

(Answers to sections A and B must be kept separate.)

A.

1. Distinguish the various types of primary schools in Ontario. Describe the system of classification of an Ontario primary school and discuss the merits of the system.

or

Distinguish the various types of secondary schools in Ontario. Describe the system of classification of an Ontario secondary school and discuss the merits of the system.

2. Discuss the 'use and abuse of homework' and the 'ways and means of promotion' in public schools *or* high schools, and state in detail both your procedure and the law (if any) in regard to homework and promotions.

3. (a) How does the Ontario high school seek to safeguard the physical well-being of the pupil?

(b) How does the Ontario rural school seek to safeguard the special interests of the rural districts?

B.

4. (a) Describe the Junior High School Entrance Examination under the following headings: subjects and papers, constitution of the board of examiners, admission of special cases, issuance of certificates.

(b) Distinguish in purpose and character the Junior High School Entrance and the Senior High School Entrance Examinations.

5. State in detail the duties of High School principals and the legal qualifications of both principals and assistants in Continuation Schools, High Schools, and Collegiate Institutes.

6. Define in accordance with the laws and regulations any five of the following: Night High Schools, Fifth Classes, Kindergartens, School Gardens, Compulsory Attendance, Religious Instruction, the Duties of Inspectors.

METHODS IN PUBLIC SCHOOL SUBJECTS.

Examiner—F. E. COOMBS, M.A.

1. Indicate definitely your method of presenting the following poem to a IV form class.

When I was a beggarly boy
And lived in a cellar damp,
I had not a friend or a toy,
But I had Aladdin's lamp;
When I could not sleep for cold,
I had fire enough in my brain,
And builded with roofs of gold
My *beautiful castles* in Spain!
Since then I have toiled day and night,
I have money and power good store,
But I'd give all my lamps of silver bright
For the one that is mine no more;
Take, Fortune, whatever you choose,
You gave and may snatch again;
I have nothing 'twould pain me to lose,
For I own no more castles in Spain!

2. Use the following words as the subject-matter of a spelling lesson. Indicate in detail your method of presenting them to a class: singeing, agriculture, changeable, compulsory, gymnasium, marriageable.

3. Discuss fully your method of dealing with the story in a grade I class.

4. (a) Choose a definite lesson from the field of primary arithmetic. Indicate fully your method of dealing with it.

(b) What general inferences, if any, would you draw concerning method in arithmetic in primary grades?

METHODS IN ENGLISH.

Examiner—O. J. STEVENSON, M.A., D. PAED.

1. In teaching a lesson on the function and classification of the participle, in English Grammar, in Form I of the High School;

(a) What previous knowledge would you bring to bear?

(b) What use would you make of the inductive and the deductive methods respectively?

2. Point out what results you would aim to secure, and state in some detail the method you would follow in teaching the following poem to a Form II class.

HOME THOUGHTS, FROM ABROAD

OH, to be in England
Now that April's there,
And whoever wakes in England
Sees, some morning, unaware,
That the lowest boughs and the brushwood sheaf
Round the elm-tree bole are in tiny leaf,
While the chaffinch sings on the orchard bough
In England—now!
And after April, when May follows,
And the white-throat builds, and all the swallows!
Hark! where my blossomed pear tree in the hedge
Leans to the field and scatters on the clover.
Blossoms and dewdrops—at the bent spray's edge—
That's the wise thrush; he sings each song twice over,
Lest you should think he never could recapture
The first fine careless rapture!
And though the fields look rough with hoary dew,
All will be gay when noontide wakes anew
The buttercups, the little children's dower
—Far brighter than this gaudy melon-flower.

3. The following essay is written by a pupil of Form IV. Make a list of the chief defects to which you would call his attention. Mark an example of one of each of these defects, and return the essay thus marked, with your answer papers.

THE CITY FROM THE ISLAND.

One can hardly realize the superb magnificence of Toronto, the "Queen City" of the dominion, unless one had had the good fortune to view it from that perfect spot of paradise, Centre Island.

Centre Island is, as the name implies, the middle portion of that low-lying bank of sand which hems in the waters of the harbour, and keeps the angry waves off lake Ontario from wrecking the shipping which is constantly being carried on in the bay.

Looking at the city from across the water one is instantly struck by the grandeur of the picture spread out to view.

The downtown district, although often overhung by dense clouds of smoke generally has the appearance of cleanliness, and the many lofty spires, which raise their proud heads to the blue sky above, lend to the scene an enchantment which savours of something mighty and beyond contemplation.

The beautiful private dwellings, which are to be seen built on the side of the hill, show the houses of some of Toronto's wealthiest citizens. Most of the houses are built back from the street and generally have a very picturesque lawn which is extremely pleasing to the eye.

Also the many recreation parks to be seen scattered about the city, besides providing a quiet resting place to the tired workman, give the place the appearance of having plenty of healthful breathing space which is not looked after sufficiently in most large cities. Along the waterfront are the ruined walls and crumbling masonry, the only remains to mark the place where, at an earlier date, magnificent buildings stood forth and defied the efforts of wind and tempest.

The walls have never been torn down and modern buildings erected in their place and there the ruins still stand in all their splendour, grim reminders of the great Toronto fire, in which so many innocent people lost their lives.

The reverberating sounds made by trams, trains, automobiles, all come floating continuously across the water, until at length they reach your ear, welded into one great awesome roar; and, as you stand on the sandy shore gazing toward the city, you will unconsciously predict the time when Toronto will rank among the foremost cities of this great throbbing body termed the world.

4. (a) Point out the relation of Oral Reading to Literature, as subjects of study.

(b) What are the main points to which the teacher must give attention in his preparation of a reading lesson. Illustrate, if necessary, by reference to the poem quoted in question 2.

METHODS IN HISTORY AND GEOGRAPHY.

Examiners— { W. E. MACPHERSON, B.A., LL.B.
 { G. A. CORNISH, B.A.

NOTE—Answers to A and answers to B are to be in separate books.

A.

Candidates will answer any three questions.

1. Describe varieties of home work or desk work that might be expected from a middle school class studying the period of the French wars 1793–1815. Mention four definite assignments.

2. In teaching the Quebec Act to a middle school class in Canadian history, (a) what terms would you expect them to learn? (b) How might you expect to connect this matter with previous knowledge?

3. You are teaching a middle school class in British history a series of lessons on the condition of the country at the accession of George III. What facts with regard to the political condition should be brought out clearly in view of various reforms to be noticed later.

4. How far might the origin and growth of the British Parliament before the Tudor times be taken up with a lower school class? What topics might be discussed with them?

B.

1. Describe how the stratified rocks and soils have been derived from the igneous rocks. Outline experiments that might be performed in teaching the above topic.

2. Give a brief geological history of the Great Lakes.

METHODS IN MATHEMATICS.

Examiner—J. T. CRAWFORD, B.A.

NOTE—An option is allowed between questions 6 and 7.

1. What is the special object sought in the teaching of geometry? Show what steps you would take, in pursuit of this object, in dealing with the axioms of geometry.

2. Multiply 4.2763 by 3.1426 and divide the product by 2.1354, using contracted methods so as to obtain a result correct to three decimal places.

3. Teach a lesson on the method of discounting at a bank an interest-bearing note, using your own illustration and giving a complete solution.

4. Give brief notes on the method of teaching:

(a) The rule of signs in algebraic multiplication.

(b) The solution of simple simultaneous equations of two unknowns.

5. Outline a lesson on the method of finding the formula for the area of a circle of given radius.

6. In any circle if two chords are equal distances from the centre, they are equal. In taking this up as an original exercise, state the questions you would ask and the answers you might expect from pupils of average ability.

7. "If \$250 amounts to \$270.40 in 2 years at compound interest, find the rate per cent." A pupil who can find the amount of a sum at compound interest says he cannot solve this problem. State the questions you would ask and the answers you would expect in developing the solution.

METHODS IN CLASSICS.

Examiner—H. J. CRAWFORD.

A.—LATIN.

1. Eo cum venisset, circumitis omnibus hibernis, singulari militum studio in summa omnium rerum inopia circiter sescentas ejus generis, cujus supra demonstravimus, naves et longas viginti octo invenit instructas neque multum abesse ab eo, quin paucis diebus deduci possint.

In teaching the translation of this sentence, indicate where you would direct the attention of a class to idiomatic differences. Give a model version.

2. Frame six suitable questions in Grammar on this sentence and answer them.

3. Sketch a summarizing lesson on the declension of Adjectives in Latin.

4. vestibulum ante ipsum primoque in limine Pyrrhus exsultat telis et luce coruscus aena:

qualis ubi in lucem coluber mala gramina pastus,
frigida sub terra tumidum quem bruma tegebat,
nunc positis novus exuviis nitidusque iuventa,
lubrica convolvit sublato pectore terga,
arduus ad solem, et linguis micat ore trisulcis.

Write a careful translation.

5. Describe a lesson on the similes occurring in the portion of book II prescribed for pass matriculation.

B. GREEK.

1. ἄλλ' οὐ μοι Τρώων τόσσον μέλει ἄλγος ὀπίσσω,
οὔτ' αὐτῆς Ἑκάβης οὔτε Πριάμοιο ἄνακτος
οὔτε κασυγνήτων, οἳ κεν πολέες τε καὶ ἐσθλοὶ
ἐν κονίησι πέσοιεν ὑπ' ἀνδράσι δυσμενέεσσιν,
ὅσσον σεῦ, ὅτε κέν τις Ἀχαιῶν χαλκοχιτώνων
δακρυνόεσσαν ἄγηται, ἐλεύθερον ἡμᾶρ ἀπούρας.
καὶ κεν ἐν Ἄργει ἐοῦσα πρὸς ἄλλης ἰστὸν ὑφαίνοις,
καὶ κεν ὕδωρ φορέοις Μεσσηίδος ἢ Ὑπερείης
πόλλ' ἀεκαζομένη, κρατερῇ δ' ἐπικείσεται ἀνάγκη·
καὶ ποτέ τις εἴπησιν ἰδὼν κατὰ δάκρυ χέουσαν·
'Ἐκτορος ἦδε γυνή, ὃς ἀριστεύεσκε μάχεσθαι
Τρώων ἵπποδάμων, ὅτε Ἴλιον ἀμφεμάχοντο.'

Make a careful translation.

2. Specify the Epic forms in the first 6 lines which invite comparison with the Attic, and make the comparison.

3. Describe a summarizing lesson on (a) the comparison of Adjectives *or* (b) the mood synopsis of *πείθω* in all tenses, *or* (c) conditional relative clauses.

4. Κῦρος δὲ συγκαλέσας τοὺς στρατηγοὺς καὶ λοχαγοὺς τῶν Ἑλλήνων συνεβουλεύετό τε πῶς ἂν τὴν μάχην ποιῶιτο καὶ αὐτὸς παρήνει θαρρύνων τοιάδε· “ὦ ἄνδρες Ἕλληνες, οὐκ ἀνθρώπων ἀπορῶν βαρβάρων συμμάχους ὑμᾶς ἄγω, ἀλλὰ νομίζων ἀμείνους πολλῶν βαρβάρων ὑμᾶς εἶναι, διὰ τοῦτο προσέλαβον. ἔστε οὖν ἄνδρες ἀξιοὶ τῆς ἐλευθερίας ἧς ἔχετε καὶ ἧς ὑμᾶς ἐγὼ εὐδαιμοίζω.”

Give a translation of the extract, with the especial view of bringing out clearly the force of the participles.

METHODS IN SCIENCE.

Examiner—G. A. CORNISH, B.A.

1. State the laws of multiple proportions and of combining weights. Describe the method of teaching these laws indicating any experiments to be performed.

2. Outline a course of laboratory work on hydrochloric acid and chlorine, showing the order in which the experiments would be taken.

3. Describe fully an individual experiment to prove the law of refraction of light.

4. State the facts to be taught to a lower school class on *one* of the following topics:

(1) Dispersion of light.

(2) Stem structure in dicotyledons and monocotyledons.

(3) Chemical equilibrium.

METHODS IN FRENCH AND GERMAN.

Examiner—W. C. FERGUSON, B.A.

Candidates taking French only will answer questions 1, 2, 3, 4. Candidates taking German only will answer questions 1, 2, 5, 6. Candidates taking the Moderns Option will answer *five* questions,—Nos. 1, 2, 3, 5, and *either* part A *or* part B of 4 *and* 6.

1. (a) State concisely the principal difficulties which confront the young pupil in beginning the study of French or German, showing what means you would adopt to help to overcome them.

(b) Explain the statement that “language is partly rational and partly irrational.”

(c) Indicate clearly the methods you would advocate to aid and strengthen the memory in the acquirement of correct vocabulary and syntax.

2. Give the full material of a lesson on the “Time of the Day” as expressed in French *or* German, with suggestions in regard to the best methods of enforcing your teaching.

3. Teach a lesson to a Middle School class on the forms and uses of the Disjunctive Personal Pronouns in French, contrasting them with the Conjunctive Personal Pronouns with which the class is already familiar. Give ten or more complete sentences to illustrate at least five of the ways in which these pronouns are used.

4. (a) Et jusqu'à ce que le petit François fût sur pied, une voiture s'arrêta tous les jours devant le logis d'ouvrier de la rue des Abbesses, à Montmartre, et un homme en descendit, enveloppé dans un paletot, le collet relevé, et, dessous costumé comme pour le cirque, avec un gai visage enfariné.

—Qu'est-ce que je vous dois, monsieur? dit à la fin Jacques Legrand au maître clown, lorsque l'enfant fit sa première sortie, car enfin je vous dois quelque chose!

Le clown tendit aux parents ses deux larges mains d'Hercule doux.

—Une poignée de main! dit-il...

Puis, posant deux gros baisers sur les joues redevenues roses de l'enfant:

—Et, dit-il en riant, la permission de mettre sur mes cartes de visite:

BOUM-BOUM.

Docteur acrobate, médecin ordinaire du petit François!

Give your general method of conducting a lesson in the translation of this extract, with what you would consider to be a satisfactory version.

Give five grammatical questions which you might ask the class to test their knowledge, with the answers you would expect.

(b) Il a bien tenté le premier an de me tirer des carottes.

—Voilà trois nuits que je n'ai pas fermé l'œil.

—J'espère réussir à me faire aimer d'elle.

—Ah! ah! que c'est mal ce que je viens de faire là!

—Dans le corps de tous les hommes qui sont devenus remarquables . . . il y a un morceau de vache enragée.

—Oui! mais ton père et le mien, ça fait deux! Ton père, c'est un brave homme, c'est une caisse qui s'ouvre de temps en temps . . . comme toutes les caisses . . . Tandis que le mien, c'est une tire-lire en fonte . . . et sans porte . . . Pour l'ouvrir, il faut la casser.

Give idiomatic translation of these passages, with explanatory notes of any difficulties.

5. Give the material of a lesson on the Conditional Sentence in German explaining clearly the formation of the Conditional mood, the substitutes for it, and the various types of sentence-structure.

6. (a) Derselben Aufsicht war eine Ameise, die bei diesem Wetter im Walde spazieren ging. Sie war am Vormittage mit Eiern in Tannenbergl auf dem Markte gewesen und trug jetzt das dafür gelöste Geld in einem kleinen blauen Leinwandbeutel nach Hause. Bei jedem Schritte seufzte und jammerte sie. „Das Kleid ist hin,“ sagte sie, „und der Hut auch! Hätt' ich nur den Regenschirm nicht stehen lassen, oder hätt' ich wenigstens die Überschuhe angezogen! Aber mit Zeugschuhen in solchem Regen ist gar kein Weiterkommen!“

So will ich liegen und horchen still,
Wie eine Schildwach', im Grabe,
Bis einst ich höre Kanonengebrüll
Und wiehernder Rosse Getrabe.

Give your general method of conducting a lesson in the translation of this extract with what you would consider to be a satisfactory version.

Give five grammatical questions which you would ask the class to test their knowledge, with the answers you would expect.

(b). — „Schlanke Dirnen, frisch und jung
Gibt's noch unter'm Mond genug.“

— „Ei freilich,“ erwiderte die Grossmutter. „Einen Schulmeister hatten wir, und was für einen! Die zehn Gebote und was man sonst noch braucht, bläute er den Kindern ein, dasz der Pfarrer, wenn er katechisierte, seine helle Freude hatte, aber sonst liesz er fünf gerade sein.“

— Kalter Schauer rieselte der vorwitzigen Dirne beim Anhören dieser Zauberformel über den Leib, bebend wie Espenlaub floh sie in ihr Kämmerlein zurück und vergrub sich in den Kissen.

— „So?“ hob die Frau an. „Während ich tagwerke und schanze, dasz mir das Blut unter den Nägeln hervorspritzt, sitzt der alte Nichtsnutz faul zu Hause, brät sich Vögel und lebt wie der Herrgott in Frankreich! Natürlich alles aufgeessen bis auf die Knochen!“

Give idiomatic translation of these passages with explanatory notes of any difficulties

NATURE STUDY.

Examiner—G. A. CORNISH, B.A.

Answer any two questions.

1. Outline a series of four experiments that might be performed when teaching lessons on soils to a fourth form public school class. Indicate the purpose, method, observation and conclusion of each experiment.

2. Describe the uses of an aquarium in nature study teaching. Give practical notes on the care of the aquarium.

3. Outline a lesson to a public school class on some common flowering plant (select a particular plant).

4. State devices for leading pupils to do observational work out of school.

MUSIC.

Examiner—G. N. BRAMFITT.

1. State and explain the three chief principles of the Sol-fa System.

2. State three chief characteristics of good tone, and tell upon what they depend.

Outline two exercises to develop each of these.

3. Explain fully the three possible methods of breathing, and state with their different values.

4. (a) Outline a lesson introducing the First Step Modulator. In this lesson give questions and answers, pupils' age being about six years.

(b) Outline a lesson on the introduction of Sol-fa pupils to the staff.

NOTE.—Do not give question and answer.

5. Write from memory in Sol-fa Notation either:

(a) The Doxology,

(b) "When He Cometh" (G. F. Root).

6. Translate the above song into the Staff Notation in any key within the compass of the voices of children of eight years, *the key of C natural excepted*.

CONSTRUCTIVE WORK AND MANUAL TRAINING.

Examiner—A. N. SCARROW.

A.

A choice is allowed between questions 1 and 2.

1. Briefly discuss the educational value of Manual Training, showing that it presents in a suitable manner the concrete material underlying all knowledge.

2. 'There is great waste in the isolation of school from life out of school.' Show (a) in what respect the isolation of school life from home life causes waste and

(b) how the subject of Manual Training may assist in overcoming this isolation.

3. You are going to conduct a lesson in Constructive work with your Senior II. class.

(a) State what you believe to be the fundamental difference between such a lesson and one in history or grammar.

(b) What would you choose for the lesson? Why?

(c) Show in detail how you would conduct the lesson.

(d) What profit would you expect your class to get from the lesson?

B.

1. You are about to conduct your first lesson in wood-work with a Junior Fourth Class of boys.

Outline your method of introducing them to the work.

2. Your Fourth Class boys are to make an inkstand or a penrack.

(a) Make a freehand drawing of the project chosen, showing plan and elevations and giving dimensions.

(b) Indicate the order of steps to be followed in making the object.

(c) State what difficulties you would expect to arise and show how you would guard against them.

3. (a) Show the importance of keeping tools in good order in connection with Manual Training.

(b) Name six of the most important tools used, and explain fully how you would keep them in proper condition.

HOUSEHOLD SCIENCE.

Examiner—ETHEL M. EADIE.

1. Mention six important conditions which should be required in the selection of a home.
2. Describe experiments to show the contents of three common food stuffs.
3. Name the five food principles.
For each food principle mentioned, name three common articles of diet in which it is found.
4. Write notes on: (a) the handling of milk;
(b) the effect of heat on milk;
(c) the nutritive value of milk.
5. Discuss the statement:—“Household economics rests on two chief cornerstones, the economy of wealth and the economy of health, — — — — even all departments of science must contribute to its development.”

METHODS IN PRIMARY READING.

Examiner—F. E. COOMBS, M.A.

1. Describe fully what you conceive to be the best method of teaching primary reading. Give reasons for your choice.
2. Draw up a lesson plan showing how you would teach a word expressing quality, e.g., red, to a grade I class.
3. (a) Upon what elements does the success of a lesson in expressive reading depend?
(b) Give in detail your views on the element of criticism in the teaching of such a lesson.

A R T.

Examiner—CHARLES W. JEFFEREYS, O.S.A.

1. Describe and compare the qualities of the various mediums used in school art work.
2. Indicate by means of a diagram the six standard colors and their relations with regard to color harmony.
3. Make a drawing in outline of a glass half full of water standing beside a cube on a level below the eye, indicating the perspective principles involved.
4. Discuss a method of conducting an art class by making use of natural objects in order: (a) to give a training in correct observation and representative drawing; (b) to develop design and imaginative power; (c) to connect the art work with other school studies.
5. What specific instructions would you give in lessons on: (a) blocking in; (b) values; (c) water color painting?

COMMERCIAL WORK.

A. BOOKKEEPING.

I. Journalize:

Toronto, March 1, 1912.

S. Martin begins business investing as follows—

Assets: Cash on hand, \$1200; Cash in The Scholastic Bank, \$4000; Goods on hand, \$8000; Note at 3 months dated Feb. 15 against R. Skelton for \$250.

Liabilities: Account in favor of G. Munro, Hamilton, \$180; Note at 60 days favor of W. Webb for \$285.30.

2. Bought goods from G. Munro on a/c, \$400. Sold goods to R. Skelton, \$360. Received in part payment his cheque for \$160. Bought office desk from Gilmore & Co. on our cheque, \$90.

4. Accepted G. Munro's draft at 10 days sight, payable at the Merchants Bank, favor of F. Hall, \$200. Drew on R. Skelton at sight for \$100. Prepaid per cheque our note favor W. Webb. Discount allowed, \$4.50.

II. (a) Write our cheque favor Gilmore & Co. of the 2nd.

(b) Write out and accept G. Munro's draft of the 4th.

III. Outline a lesson on closing the Loss & Gain and Capital accounts.

B. WRITING.

IV. Describe proper position for writing under the following heads: (a) body, (b) arms, (c) hands, (d) method of holding the pen.

V. (a) Write the small letters in groups as you would teach them.

(b) Give introductory exercises for teaching *c*, *g*, *F*, *W*.

ELEMENTARY SCIENCE.

Examiner—G. A. CORNISH, B.A.

Answer *any two* questions.

1. Describe a method of conducting a lesson in physics in which the pupils are to perform individual experiments (select some particular experiment).

2. State the two gas laws (Boyle's Law and Charles' Law.) Describe how to conduct work leading up to mathematical problems on these laws.

3. What is meant by the anomalous expansion of water? Describe an experiment to demonstrate the phenomenon. What are some of the important results in nature of this phenomenon?

4. What facts should be taught a lower school class on *one* of the following topics.

(a) Development of the frog.

(b) Habits of the crayfish.

(c) Classification of simple fruits.

(d) Relation of flower-structure to mode of pollination.

PHYSICAL TRAINING.

Examiners— $\left\{ \begin{array}{l} \text{J. W. BARTON, M.D.} \\ \text{G. N. BRAMFITT.} \end{array} \right.$

1. Outline two methods of opening out a class for drill, giving the words of command necessary.

2. Write notes upon:

- (a) Words of command,
- (b) Correction of errors in class.

3. Give:

- (a) A freehand drill,
- (b) A dumbbell drill,
- (c) A wand drill.

NOTE—The above drills must contain (each) fifteen exercises suitable for developing all the chief muscles of trunk and limbs, and must be arranged in three columns: (1) The exercise, (2) the description of the exercise, (3) the object of the exercise.

4. Give the exercises you would prescribe to remedy:

- (a) Round shoulders,
- (b) Low shoulders,
- (c) Deficient lung capacity,
- (d) Uneven hips.

5. Give exercises for developing:

- (a) Muscles of the calf,
- (b) Upper arm in front,
- (c) Front of thigh,
- (d) Lower back.

SEMINAR IN NINETEENTH CENTURY EDUCATION.

Examiner—W. PAKENHAM.

1. "In the educational legislation between 1846 and 1876 Ryerson strove to achieve a fine balance between local and central control" Discuss this statement in detail.

2. (a) Sketch the rise of the Grammar school in Upper Canada before 1837.

(b) Describe a typical Canadian Grammar school in 1837.

3. Contrast in organization, methods, and courses of study a Prussian and an Ontario elementary school.

4. Compare briefly the French, English, and American methods of training teachers for elementary schools.

5. Outline the history of state interference in Secondary education in England

or

Outline the history of the Universities of England since 1850, calling attention to the more important present-day problems in University education.

SEMINAR IN MODERN EDUCATIONAL THEORY.

Examiner—H. T. J. COLEMAN.

The candidate will answer *any five* questions.

1. What views are set forth in Milton's Tractate on Education as to:

(a) The Aim of Education,

(b) The content of the ideal curriculum.

2. In what respects does Locke's essay on "The Conduct of the Understanding" support the view that the chief value of any system of education is in the mental discipline which it furnishes?

3. Outline Rousseau's argument in favor of tutorial education. State in general terms Rousseau's conception of the character and duties of the ideal tutor.

4. What were Rousseau's views as to the stages of development of the human individual? In what particular ways does he adapt his proposed educational system to the needs of these different stages?

5. What were Pestalozzi's views as to the function of the home as an educational agency?

6. Indicate in general terms the influence of Pestalozzi upon, (a) the method of modern elementary education, (b) the content of the curriculum of the modern elementary school.

7. Contrast Pestalozzi and Herbart as to importance which each attached to sense-perception.

8. Wherein did Froebel and Herbart differ in their views of the nature of the "self"? How did this fundamental difference affect their views as to method in teaching?

SEMINAR IN HISTORY OF ANCIENT PHILOSOPHY.

Examiner—H. T. J. COLEMAN.

The candidate will answer *any five* questions.

1. Discuss the nature and the scope of the scientific speculations of the pre-Socratic philosophers.

2. Explain the nature of the antithesis between the doctrine of "Being" and the doctrine of "Becoming" and indicate the place of this antithesis in the pre-Socratic philosophy.

3. What were the essential characteristics of the Sophistic doctrine? Show the relation of that doctrine to the age in which the Sophists flourished.

4. Describe the character and mission of Socrates as they are revealed in Plato's Apology.

5. Trace the elaboration of the concept of Justice as it is found in Plato's Republic.

6. Indicate the place and value assigned to Music and Gymnastics by Plato in his ideal curriculum.

7. What were the views of Plato as to the education and the responsibilities of the true philosopher?

8. Give the substance of Plato's Allegory of the Cavern and indicate the theory of knowledge which it sets forth.

9. State the Platonic theory of Ideas and mention the chief points in Aristotle's criticism of this theory.

10. What were Aristotle's views, (a) as to the origin and nature of Philosophy, (b) as to the four causes?

SEMINAR IN MATHEMATICS.

Examiner—J. T. CRAWFORD, B.A.

1. "The genesis of knowledge in the individual must follow the same course as the genesis of knowledge in the race."

Accepting the correctness of this principle explain, with illustrations, how the knowledge of the history of mathematics must be an effectual aid in teaching.

2. Write an account of the history and development of common and decimal fractions.

3. Explain what is meant by the method of analysis as applied to the solution of original exercises in geometry. Illustrate your answer by applying the method to the solution of problems and theorems of your own choice.

4. Write notes on the subject of examinations under the following headings:

(a) Objects to be attained.

(b) When they should be held and what work should be prescribed.

(c) Marking and returning the papers.

(d) Evil effects of examinations and how to minimize them.

METHODS IN ENGLISH AND HISTORY.

(SEMINAR.)

Examiners { O. J. STEVENSON, M.A., D. PAED.
W. E. MACPHERSON, B.A., LL.B.

Note: Answer to A and answers to B are to be put in separate books.

A.

1. (a) What are the main points that you would deal with in a first lesson in Description in a lower school composition class?

(b) Suggest five or six subjects that you would assign for descriptive essays, after teaching the foregoing lesson.

2. "What is literature, and what does the term include? Shall the teacher lay stress upon literary products in and for themselves or upon literary history and literary forms? Or shall he interpret the term to include still other things, biography, language study, rhetoric, versification, aesthetics? To endeavour to cover so wide a range as this, is only to invite superficial instruction, and superficial instruction is what we get."

Answer the question contained in the first sentence. Apply the facts of your answer to the solution of the problem involved in the remainder of the quotation.

3. (a) State in some detail the procedure you would follow in the study of the prescribed texts in literature in Form IV.

(b) Aside from the study of the verbal difficulties which the play presents, what are the chief points that you would consider it necessary to deal with, in teaching *A Midsummer Night's Dream* to a Form IV class.

B.

4. Give as definitely as you can materials for a review lesson on the rise of the modern system of responsible government in England.

5. Using for purposes of illustration the wars between England and France in the reigns of Edward III and William III, show how the teaching of wars may be used to throw light on the economic and social condition of the times.

METHODS IN FRENCH AND GERMAN. (SEMINAR.)

Examiner—W. C. FERGUSON, B.A.

1. Discuss the value of phonetics in the teaching of German. Show how you would teach the Umlaut vowels and the *ich* and *ach* sounds.

2. Compare the aims and conditions of the teaching of modern languages in Europe and in Canada, with special reference to the consequent methods to be employed.

3. Explain clearly what is meant by the analytical-inductive method of teaching modern languages. Show

what uses you would make of *either* of the following extracts in teaching a lesson by this method.

(a) Le maréchal Turenne se levait toujours de fort bonne heure. Un matin qu'il prenait l'air à la fenêtre, un de ses gens, voyant un homme accoudé là en bonnet de coton, le prend pour un autre domestique, et lui donne amicalement un énorme coup de poing. L'homme se retourne, et c'est Turenne,—“Monseigneur,” s'écrie le frappeur, “j'ai cru que c'était Georges....” “Mais, quand c'eût été Georges,” dit Turenne en se frottant, “il ne fallait pas frapper si fort!”

(b) Der Dichter Rossetti war auch als Maler berühmt. Ein Fürst aus Indien besuchte ihn einmal und sagte zu ihm: “Können Sie mir ein Bildnis von meinem Vater malen?” “Ist Ihr Herr Vater jetzt in London?” fragte der Künstler. “Nein, mein Vater ist tot,” antwortete der Fürst. “Haben Sie vielleicht eine Photographie von ihm?” “Nein, wir haben gar kein Bildnis von ihm.” “Wie kann ich denn sein Bildnis malen? Das ist unmöglich. Es ist lächerlich. Das kann ich nicht tun.” “Weshalb ist es lächerlich?” erwiderte der Fürst. “Sie haben Cäsar, Hannibal und die zwölf Apostel gemalt; warum können Sie denn meinen Vater nicht malen?”

4. “Das Übersetzen in die Fremdsprache zum Zwecke der Erlernung derselben gehört einfach in das Gebiet pädagogischer Sünden und Verirrungen.”

Bierbaum, *Die neueren Sprachen*.

Examine the truth of this statement.

METHODS IN ENGLISH AND HISTORY. FOR SPECIALISTS.

Examiners—{ O. J. STEVENSON, M.A., D. PAED.
W. E. MACPHERSON, B.A., LL. B.

NOTE—Answers to A and answers to B should be in separate books.

A.

1. Compare the teaching of grammar and literature in the lower school, as to (a) aim, (b) general method.

2. (a) Name six books in prose that would, in your opinion, be suitable for class work in supplementary reading in the middle school.

(b) Candidates for departmental examinations are required to read during the preceding year at least four suitable works in English literature, both prose and poetry, in addition to those prescribed for examination.

What means would you take to see that the requirements of this regulation are fulfilled.

(c) State briefly how you would conduct a lesson in supplementary reading.

3. "Upon what depends primarily the creation of that peculiar charm of expression that we call style? Manifestly it is something that cannot be imparted by direct instruction. How then can it be best acquired, if it can be acquired at all?"

Discuss the foregoing question from the standpoint of the teacher of composition in the secondary schools.

4. When in disgrace with Fortune and men's eyes
I all alone bewep my outcast state,
And trouble deaf heaven with my bootless cries,
And look upon myself, and curse my fate;
Wishing me like to one more rich in hope,
Featured like him, like him with friends possess't,
Desiring this man's art, and that man's scope,
With what I most enjoy contented least,
Then in these thoughts myself almost despising,
Haply I think on thee—and then my state,
Like to the lark at break of day arising
From sullen earth, sings hymns at heaven's gate;
For thy sweet love remembered, such wealth brings
That then I scorn to change my state with kings.

You have given this passage to Form IV for sight-work in literature. Draw up a series of questions for written examination which will test their interpretation of it.

B.

5. Describe as for a lower school class the nature and rise of the feudal system in England.

6. Give materials and describe general procedure of a lesson on the Union Act of 1840 to a middle school class in Canadian History. What information leading to this topic would you expect them to have already?

METHODS IN MATHEMATICS.

FOR SPECIALISTS.

Examiner—J. T. CRAWFORD, B.A.

1. Teach a lesson on the method of solving a reciprocal equation using as an illustration:

$$6x^4 - 7x^3 - x^2 - 7x + 6 = 0.$$

Solve this equation in full.

2. Give the analysis of the following theorem—" AB is a chord of a circle and CA and CB are tangents at its extremities. P is any point on the circumference. Prove that the perpendicular from P to AB is a mean proportional between the perpendiculars from P to CA and CB ."

3. Show what use might be made of squared paper in dealing with the trigonometrical ratios.

4. Find the length of the perpendicular from the point (a, b) to the straight line whose equation is $Ax + By + C = 0$. Explain the meaning of the double sign.

5. Write notes on the method of finding the present value of a mortgage, choosing your own illustration and giving a complete solution.

6. Teach a lesson on the geometrical analysis of the ambiguous case in the solution of triangles, the object being to determine the necessary conditions for ambiguity.

METHODS IN CLASSICS.

FOR SPECIALISTS.

Examiner—H. J. CRAWFORD.

1. O nata mecum consule Manlio,
seu tu querellas sive geris iocos
seu rixam et insanos amores
seu facilem, pia testa, somnum,
quocumque lectum nomine Massicum
servas, moveri digna bono die,
descende, Corvino iubente
promere languidiora vina.

non ille, quamquam Socraticis madet
 sermonibus, te negleget horridus:
 narratur et prisci Catonis
 saepe mero caluisse virtus.
 tu lene tormentum ingenio admoves
 plerumque duro; tu sapientium
 curas et arcanum iocoso
 consilium retegis Lyaeo;
 tu spem reducis mentibus anxiis
 viresque et addis cornua pauperi,
 post te neque iratos trementi
 regum apices neque militum arma.
 te Liber et si laeta aderit Venus
 segnesque nodum solvere Gratiae
 vivaeque producent lucernae,
 dum rediens fugat astra Phoebus,

Translate this Ode carefully and show how you would treat it under *any two* of the following heads: (1) metre and reading (2) theme and style (3) explanatory comment (4) poetic illustrations.

2. Caesari cum id nuntiatum esset, eos per provinciam nostram iter facere conari, maturat ab urbe proficisci et quam maximis potest itineribus in Galliam ulteriorem contendit et ad Genavam pervenit. Provinciae toti quam maximum potest militum numerum imperat: erat omnino in Gallia ulteriore legio una: pontem qui erat ad Genavam iubet rescindi. Ubi de eius adventu Helvetii certiores facti sunt, legatos ad eum mittunt nobiles civitatis, cuius legationis Nammelius et Verucloetius principem locum obtinebant, qui dicerent, sibi esse in animo sine ullo maleficio iter per provinciam facere, propterea quod aliud iter haberent nullum; rogare ut eius voluntate id sibi facere liceat. Caesar, quod memoria tenebat L. Cassium consulem occisum exercitumque eius ab Helvetiis pulsum et sub iugum missum, concedendum non putabat, neque homines inimico animo data facultate per provinciam itineris faciendi temperaturos ab iniuria et maleficio existimabat: tamen, ut spatium intercedere posset, dum milites quos imperaverat convenirent, legatis respondit: diem se ad deliberandum sumpturum; si quid vellent, ad Id. Apr. reverterentur.

This chapter is to be used as the basis of a lesson in Latin composition.

(a) Note at least 8 important idioms or constructions.

(b) Incorporate these into a piece of idiomatic English suitable as a class exercise in Latin composition.

(c) Give a Latin version of your English piece.

3. Οἱ δὲ ἐφ-ορμοῦντες ἔτυχον ἐν τῇ γῆ ἀριστο-ποιούμενοι. εὐθὺς δὲ ἐγειρόμενοί τε καὶ εἰς-βάντες ὡς τάχιστα, ἀποκόπτοντες τὰς ἀγκύρας ἐβοήθουν τεταγμένοι, ὡς ἕκαστοι ἤνοιγον. οὕτω δὲ τὴν μὲν ἑτέραν ναῦν τὴν εἰς τὸ πέλαγος ἀφ-ορμήσασαν ἐδίωκον, καὶ ἅμα τῷ ἡλίῳ δύνοντι κατέλαβον. ἡ δ' ἑτέρα ἡ ἐπὶ τοῦ Ἑλλησπόντου φυγοῦσα ναῦς δι-έφυγε, καὶ ἀφ-ικομένη εἰς τὰς Ἀθήνας ἐξ-αγγέλλει τὴν πολιορκίαν.

(a) Give an idiomatic English translation.

(b) Construct four short English sentences for translation into Greek, based on idioms in the text, and turn the four into Greek.

(c) Ask appropriate grammatical questions on εἰσβάντες, ἤνοιγον, ἐπὶ τοῦ Ἑλλησπόντου, φυγοῦσα, and answer the questions.

4. Write notes on twelve good books for the teacher's classical library.

METHODS IN FRENCH AND GERMAN.

FOR SPECIALISTS.

Examiner—W. C. FERGUSON, B.A.

1. Give full notes of a lesson to be taught to an elementary class to secure an accurate pronunciation of the sounds represented by *o*, *u*, *au*, *eu*, and *œu* in the following French words: *aujourd'hui*, *autre*, *bœufs*, *chose*, *corde*, *déjeuner*, *eu*, *feu*, *fleur*, *forêt*, *haut*, *heureux*, *j'aurai*, *jeune*, *neveu*, *œuf*, *rude*, *seul*, *trop*, *tu*.

2. Using the following sentences, which are to be translated into French, as the basis for your teaching show clearly how you would explain the various ways of rendering the English word *what*.

- (1) I do not know what he will say.
- (2) What author has said that?
- (3) Carry away what is on the table.
- (4) What were you thinking of when you said what you did?
- (5) What is the reason of his silence?
- (6) What is that building which we see yonder?
- (7) What do you wish me to do?
- (8) What is worse, is that he isn't ashamed.
- (9) That is what I complain of also.
- (10) In what can I serve you, my dear friend?

3. Explain clearly how you would teach the declension of nouns derived from adjectives or participles in German, using as examples the words, *arm*, *fremd*, *gesandt*, *reisend*.

4. Show how you would proceed with the correction of the following extract in German prose, which has been placed on the black-board by an Upper School pupil.

Ein Holzhauer saß auf dem Ufer eines Flusses und weinte laut. Darauf eine Nixe schien und sagte "Was hat dir geschehen? Warum weinen Sie?" Er antwortete dasz seine Axt von seiner Hand geglitten hatte, und im Fluss gefallen hatte. Der unglückliche Mann hatte keine Axt, und konnte kein Brot für seine Kinder verdienen. Dann sie tauchte unter, und brachte herauf eine silberne Axt. Sie fragte wenn diese Axt sein sei. Er sagte dasz seine Axt aus Eisen sei. Noch einmal tauchte sie und zeigte ihm eine eiserne. "Das ist mein" sagte er. Die Nixe gab ihm beide Axte, weil er so ehrlich war. Der Holzhauer dankte sie und ging froh zu Hause.

5. (a) Show how you would deal with the following extracts, in order to secure an accurate idiomatic translation. Add explanatory notes of all difficult words and phrases.

(b) Write notes on the cases of the subjunctive mood occurring in the two extracts.

Malheureusement, ou plutôt heureusement, l'effet qu'elle s'était promis de sa cruauté envers le pauvre cheval était perdu en grande partie pour Orso. Il ne doutait pas que cette mutilation sauvage ne fût l'œuvre d'un de ses ennemis, et c'était Orlanduccio qu'il soupçonnait particulièrement; mais il ne croyait pas que ce jeune homme, provoqué et frappé par lui, eût effacé sa honte en fendant l'oreille à un cheval. Au contraire, cette basse et ridicule vengeance augmentait son mépris pour ses adversaires, et il pensait maintenant avec le préfet que de pareilles gens ne méritaient pas de se mesurer avec lui. Aussitôt qu'il put se faire entendre, il déclara à ses partisans confondus qu'ils eussent à renoncer à leurs intentions belliqueuses, et que la justice, qui allait venir, vengerait fort bien l'oreille de son cheval.

— Je suis le maître ici, ajouta-t-il d'un ton sévère, et j'entends qu'on m'obéisse. Le premier qui s'avisera de parler encore de tuer ou de brûler, je pourrai bien le brûler à son tour. Allons! qu'on me selle le cheval gris.

—Comment, Orso, dit Colomba en le tirant à l'écart, vous souffrez qu'on nous insulte? Du vivant de notre père, jamais les Barricini n'eussent osé mutiler une bête à nous.

Der Bediente ward entlassen. „Das sieht mir doch etwas gespenstig aus!“ brummte der Bürgermeister verlegen lächelnd vor sich hin und lag wieder im Fenster. Nach einiger Zeit trat der Bediente ungerufen herein und meldete, das Kammermädchen sitze totenblaß und weinend in der Küche und erzähle, der tote Gast sei beim Fräulein Tochter des Herrn Bürgermeisters. Das Fräulein thue mit der schrecklichen Gestalt sehr bekannt; der Unbekannte habe dem Fräulein ein Paar prächtige Armbänder überreicht und dazu etwas leise mit dem Fräulein gesprochen. Das Kammermädchen habe zwar alles gesehen, aber nichts verstanden; es wäre auch vom Fräulein sogleich aus dem Zimmer fortgeschickt worden.

METHODS IN SCIENCE. FOR SPECIALISTS.

Examiner—G. A. CORNISH, B.A.

1. What is the chief value of science as a subject of study in the high school? Show what methods of teaching should be adopted to make it most valuable.
2. Discuss the place of the atomic and molecular theories in the elementary teaching of chemistry. At what point in the course can they be profitably introduced?
3. Describe the modifications of the skeletal and muscular systems of a bird in connection with aerial life.
4. State the experimental evidence that goes to support the theory of ionization in aqueous solution.

BACHELOR OF PEDAGOGY.

SECTION A—PAPER I.

Answer *any five* questions.

1. (a) Explain clearly the difference between brightness sensations and colour sensations.

(b) Show, by reference to visual sensations, the difference between *quality* and *intensity* of sensation.

(c) State and illustrate Weber's law.

2. (a) Point out the conditions to which the localization of tactual impressions is due.

(b) "The keenness of vision and the perception of directness and distances in the field of vision are two different functions, which depend upon different conditions."

State the conditions upon which each of these functions depends.

3. Give Wundt's views as to:

(a) The nature of emotion as distinguished from feeling.

(b) The nature and significance of the physical concomitants of emotion.

4. (a) Point out what psychological elements are involved in the process of recognition.

(b) What distinction does Titchener make between *recognition*, *direct apprehension* and *memory*?

(c) "An idea is formed in correspondence with an object or process of the outside world. It lapses from consciousness, to be recalled after a certain interval. What becomes of it in the meantime?" What is Titchener's answer to this question?

5. "Reasoning is the name given to the successive association of judgments."

Explain and illustrate.

6. Compare the views of Titchener and Wundt as to what is involved in the process of volition.

BACHELOR OF PEDAGOGY,

SECTION A—PAPER II.

Answer any five questions.

1. "Emotions are the products of growth. They are impossible in the very young child, and only gradually do they become possible." Justify this statement.

2. Give your views as to (a) the nature of imitation, and (b) the part which it plays in child-development.

3. "What are the parts of which mental life is composed? The obvious answer is, of course, feeling, attention, will, memory, intellect, imagination, perception, and so on. This was the classical answer of the old "Faculty psychology." But modern psychology cannot be satisfied with the enumeration of such faculties, as if they really represented what goes on in any mind."

State the point of view of modern psychology, and show what effect the change in point of view has had upon educational theory.

4. Discuss the practical bearing of psychology upon the teaching of reading and spelling in the primary grades.

5. (a) Upon what conditions does the efficiency of social organization depend?

(b) Show to what extent these conditions are possible in the school as a social organization.

6. (a) Explain the nature of democracy.

(b) Point out some of the problems of modern education that are due to the fact that society has become democratic.

BACHELOR OF PEDAGOGY.

SECTION A—PAPER III.

Answer any four questions.

1. Write notes on the following:

(a) Aristotle's conception of the nature of happiness;

(b) Aristotle's theory of the relation of the soul to the body.

(c) The nature of friendship according to Aristotle.

2. What was Aristotle's notion of the relation of Egoism to Altruism? Contrast it, in this regard, with the utilitarian conception.

3. "As Mill cannot consistently classify pleasures as lower or higher but only as more or less intense, enduring or productive, he is not entitled to say that the end of action is the common good."

Discuss the foregoing quotation.

4. State and criticize Hobbes' theory of the "State of Nature."

5. Outline Hume's theory of the nature of the will and point out any errors or inconsistencies which, in your opinion, may inhere in it.

6. State Herbert Spencer's general formula of evolution and show in some detail how he applies it in his theory of the origin and nature of moral conduct.

7. "No hedonistic theory can plausibly explain morality without assuming ideas inconsistent with its essential principle."

Discuss the foregoing, illustrating your remarks by references to typical hedonistic theories.

BACHELOR OF PEDAGOGY.

SECTION A—PAPER IV.

Answer any four questions.

1. Discuss the antithesis between the doctrine of Being and the doctrine of Becoming as it is revealed in the speculations of the pre-Socratic philosophers.

2. "It was that remarkable group of teachers known as the Sophists who seem first to have brought the ethical problem to the front."

(a) Justify this statement by reference to the history of Greek philosophy.

(b) What particular form did the ethical problem assume with the Sophists.

3. Contrast Plato and Aristotle as to: (a) their conception of the meaning and method of philosophy; (b) their conception of the nature of the "idea."

4. Define virtue. What difficulties are there in the way of a formal classification of virtues? What, in your opinion, are the relationships between virtue on the one hand and knowledge and habit on the other.

5. Discuss in some detail the meaning of the terms 'character' and 'conduct' as these terms are used in ethical theory.

6. Outline Kant's theory of the nature of the moral imperative. Mention the chief objections which recent critics have made to this theory. Estimate the value of these objections.

BACHELOR OF PEDAGOGY.

SECTION B—PAPER I.

1. The constitution of Cleisthenes is said to have produced the most perfect Democracy in the world's history. Show how the perfection of this Democracy and the conditions accompanying it tended to subvert the old Greek education and to bring new ideals and practices into the life of the people.

2. Discuss the relation of the Sophists to the Philosophic Schools of Plato and Aristotle.

3. (a) What explanation is there of the great influence exercised by the Christian Church immediately after the fall of the Roman Empire.

(b) What was the effect, as regards education, of this church supremacy from the fall of Rome to the time of Charlemagne.

4. (a) Show how the political conditions of Italy in the fifteenth and sixteenth centuries affected the Renaissance.

(b) Compare the educational aspects of the Renaissance as they developed in Italy with the forms it assumed in Germany and England.

5. Write a sketch of Humanism, dealing particularly with the Schools of Vittorino da Feltre and Sturm, and with the decadence of the Humanistic movement.

6. What educational reforms were advocated by Mulcaster?

7. Describe the origin of the Jesuit Schools, and point out the particular services they have rendered to educational progress.

BACHELOR OF PEDAGOGY.

SECTION B—PAPER II.

NOTE—Candidates will write on one part, either (a) or (b) of each question. The answers are expected to be given as fully as time will permit.

1. (a) Write a sketch of German education, as it has developed from the year 1800 to the present time.

(b) Describe the educational development in Ontario from 1800 to the present.

2. (a) Discuss the Scientific tendency in Modern Education, using the word scientific in its broad sense relating to method as well as matter.

(b) Point out the more important tendencies and developments of the Education of the present day, stating what value you think attaches to each.

3. (a) What were the main criticisms of the English Education of his time that were made by Spencer and what means did he propose for remedying the evils.

(b) Point out how the character of the people in Germany, England and the United States has led to theories and methods of Education peculiar to each country.

BACHELOR OF PEDAGOGY.

SECTION B—PAPER III.

1. Spencer's position regarding Moral Education has been criticized because his moral training is prudential and hence does not cultivate true morality.

Discuss this matter, stating clearly what you understand to be Spencer's argument, and what value you attach to it.

2. "Every moral person is born twice, once at the beginning of infancy, once at the beginning of adolescence."

(a) What are the most notable phases of mental development between infancy and adolescence? Describe these in some detail and show their relationship to education.

(b) Similarly point out the most important characteristics of the adolescent period, and show what educational changes both of curriculum and method these require.

3. Discuss the modifications of educational work made necessary by the drift of population from rural to urban communities. In this answer give specific reasons for any changes proposed.

4. Describe the play and games of children, (i) between the ages of 5 and 9 years, (ii) from 10 to 14 years of age, and show how the teacher may utilize this play spirit for school purposes, such as reading, discipline, and study.

5. Write a note on the psychology of school punishments, having regard to both primary and secondary schools.

6. To what extent, and in what ways, can the school be made a socializing agency within the community? Answer in reference to both rural and urban schools.

BACHELOR OF PEDAGOGY.

SECTION B—PAPER IV.

1. (a) Distinguish clearly between Instinct and Habit.
(b) What are the more important kinds of instinctive conduct for educational purposes, and what part may these be made to play in school work?
(c) By what process may a habit be formed in school, say that of ready and accurate expression?
2. To what extent, in your opinion, should the teacher aim at habit formation in teaching Latin and Arithmetic?
3. Discuss the value of the experimental method for the acquisition of knowledge in school. Point out its value, its limitations and its character at different periods of child development.
4. Write a note on the use that should be made of either (a) The ethical value of History or (b) The esthetic value of Literature, treated as a subject of school study.
5. Discuss "Education for efficiency" from the standpoint of present day conditions in Ontario.
6. State clearly what is involved in *Teaching children how to study*, apply your answer to one of arithmetic, nature study or geography.

DOCTOR OF PEDAGOGY.

SECTION A—PAPER I.

(Any Five Questions are a full paper.)

1. Distinguish between Reflex Action and Instinct, and show the relation of instinct to intelligence.

2. Compare the relative values of the following methods of learning: (a) Trial and error. (b) habituation. (c) association of ideas.

3. "Concrete experience will explain the highest developments of animal experience, but not the power of communication by language, which rests on the power of detaching ideas from perception and recombining them." Discuss this with reference to the various levels of human and animal intelligence.

4. Describe simple experiments for investigating the individual differences that exist in school children as to their types of mental imagery. How do such differences affect their method of learning?

5. What are the practical results, for teaching, of the various experiments on Attention? How much can be attended to at one time? How long can you attend to the same thing?

6. Analyse the phenomena of Memory, and discuss the question of possible improvement. What is the view which James holds?

7. What is perception? Distinguish between Perception, Illusion and Hallucination, giving examples of each.

8. State and criticise James's theory of the Will.

DOCTOR OF PEDAGOGY.

SECTION A—PAPER II.

(Any five questions are a full paper.)

1. Discuss the statement that "Ideas rule the world." Hence show how far the Economic and the Ideological interpretations of History are wholly opposed or only apparently conflicting doctrines.

2. "Society has never and nowhere been so organised as to transmit the products of achievement to more than a small fraction of its members". Comment on this and show how far it is consistent with modern democracy and education.

3. "The unhappy condition of the lower classes of society is due as much to error as to ignorance". What are the various causes of this error and ignorance? What remedies are there?

4. Discuss the question of genius or talent in relation to (a) heredity (b) nurture (c) opportunity.

5. "The universal prevalence of the androcentric world view, shared by men and women alike, has restricted the resources of society in the development of civilisation." Discuss this and show its bearing on the modern problems of education for women.

6. What is the analogy that Bosanquet points out between the groups or systems of which our intelligence is composed and the groups or systems which make up the fabric of society?

7. Discuss the different points of view from which the system of rights which the state maintains can be regarded.

8. What is meant by saying that "Liberty is the condition of our being ourselves"? Discuss the juristic, political and philosophical phases of the idea of liberty.

DOCTOR OF PEDAGOGY.

SECTION A—PAPER III.

(Candidates are to answer five questions, and not less than two in each part of the paper).

I.

1. Explain the significance of the terms "Being" and "Not Being" for Parmenides.

2. (a) What was the contribution of the Sophistic movement to the theory of education?

(b) Explain Socrates' opposition to the Sophists.

3. State Plato's answer to the problem of Being.

4. Discuss Aristotle's ideal of the "Contemplative life."

5. What was the Stoic theory of morals?

II.

6. State and criticize Descartes' ontological proof of God's existence,

7. Are there any elements of value in the Social Contract theory as enunciated by Hobbes?

8. Examine Locke's distinction between primary and secondary qualities. Are Berkeley's criticisms valid?

9. "Even after we have experience of the operation of cause and effect, our conclusions from that experience are *not* founded on reasoning or any process of the understanding." Hume.

Comment on this statement.

10. What was Hume's moral theory?

Do you consider it tenable?

DOCTOR OF PEDAGOGY.

SECTION A—PAPER IV.

(Candidates are to answer five questions.)

1. Explain what Kant meant by the subjectivity of time and space.

2. In what sense is Kant's theory of causation an answer to Hume?

3. Explain the importance of the schematism of the categories for scientific knowledge.

4. "The ideal of the Supreme Being is therefore nothing but a *regulative* principle of reason."

Elucidate Kant's position.

5. What was Kant's theory of Duty? Is it an adequate account of moral obligation?

6. "Kant really applies to particular cases of moral action that test of consequences which in theory he rejects."

Is this criticism justified?

7. State the Kantian proofs of God: freedom, immortality. Are they adequate?

8. Discuss the view that it is pleasure which moves to action.

9. Distinguish between determinant and reflective judgements. Explain the importance of this distinction for aesthetic judgements.

10. What are the distinguishing characteristics of the Sublime?

DOCTOR OF PEDAGOGY.

SECTION B—PAPER I.

1. "Bacon failed to appreciate the work of Aristotle and the function of genius in scientific discovery."

(a) Discuss this statement. (b) Define briefly the so-called *New Method* of Bacon. (c) How did Comenius apply the *New Method* to education?

2. "The actual influence of Comenius on his own and following generations was slight save in one respect—that of a more scientific method of teaching the languages as embodied in his text-books."

(a) Account for the "slight influence" of Comenius. (b) Describe one of the text-books of Comenius.

3. (a) Define the doctrine of 'formal discipline' as applied in educational theory. Show the connection between this doctrine and Locke's theory of knowledge. How did Locke's acceptance of the doctrine affect his methods in moral and physical training, and his choice of subjects for intellectual training?

4. "Emile aims to replace the conventional and formal education of the day with a training that is natural and spontaneous."

Describe in some detail the education of the administrative or upper classes in England or France during the eighteenth century.

5. "Few men have had as great an influence as Rousseau upon the organization, method, and content of education."

Discuss this statement in detail.

DOCTOR OF PEDAGOGY.

SECTION B—PAPER II.

1. "In respect to the two main conditions of an efficient school system, namely qualified teachers and competent inspectors, the Ontario system is unrivalled."—*Cyclopedia of Education*.

(a) Describe the Ontario system in these two respects.

(b) Compare the Ontario system with the English system with respect to "qualified teachers" and with the system of the State of Massachusetts with respect to "competent inspectors."

2. "The Ontario School Law of 1871 embodied the four great principles upon which Dr. Ryerson had steadily insisted".

(a) State these principles.

(b) Sketch the legislative history of each of these principles prior to 1871.

3. "The system of Prussia is worked by the judicious blending of central and local control."

(a) Discuss this description of the Prussian (or German) system of education.

(b) Compare as to the character of the 'central control' the educational systems of Russia, France, England, Ohio State, and Ontario.

4. Compare and contrast a French Lycée and an American High School.

5. Describe briefly the variations in the 'Matriculation requirements' of Germany, England, and the United States. Account for the variations.

6. "One of the first problems in present-day education is the problem of feeble, retarded, defective, and degenerate school children."

(a) What conditions or educational principles have given this problem its prominence?

(b) What steps have been taken in Europe to solve the problem?

(c) Suggest a solution for Ontario.

DOCTOR OF PEDAGOGY.

SECTION B—PAPER III.

Answer any five questions.

1. "Pestalozzi was a man of partial intuitions, a man who had occasional flashes of insight, rather than a man of systematic thought."

(a) Compare this verdict of Herbert Spencer with Pestalozzi's estimate of his own character.

(b) Show by reference to the educational method outlined in "How Gertrude Teaches her Children" that Spencer's estimate was, in the main, correct.

2. What did Pestalozzi mean by an "A B C of sense perception (anschauung)"? Compare Herbart's theory as to the meaning of sense-perception with that advanced by Pestalozzi.

3. What application does Spencer make of theory of the parallelism between the development of the child and the development of the race? Compare Spencer's use of this doctrine with that of Herbart and his followers.

4. Contrast Froebel with Herbart as to their theories of the nature of the self.

5. Compare any two of the following theorists as to the special interpretation made by them of the injunction "Follow nature!" Pestalozzi, Froebel, Herbart, Spencer.

6. Criticise in a general way *either* the Froebelian *or* the Herbartian Psychology from the standpoint of present day psychological theory.

7. Outline Froebel's theory as to the nature and the scope of Play.

8. Trace the influence of *either* Pestalozzi *or* Spencer upon current educational thought and practice.

DOCTOR OF PEDAGOGY.

SECTION B—PAPER IV.

Answer any five questions.

1. Outline the five-fold grouping of studies adopted by Dr. W. T. Harris. Give your own estimate of its value.

2. Discuss the problems of instinct from the following standpoints:

(a) Instinct in man as distinguished from instinct in the lower animals.

(b) The variability of instinct.

(c) The relation of instinct to emotion.

3. "The child is, in short, to begin with, neither moral nor immoral, but unmoral."

(a) What conception of the nature of morality is implied in the foregoing statement?

(b) Upon what facts of child life is this statement based?

(c) Under what conditions and at approximately what period of child development does genuine morality arise?

4. Outline Professor Dewey's theory of the true purpose of the recitation.

5. What arguments have been advanced in favor of making manual activities the centre of correlation in elementary school work?

Give your own estimate of the value of these arguments.

6. Discuss in the light of general educational theory the value of the "vocational motive" in the High School. To what extent do present conditions admit of its employment?

7. "If subjects are introduced to the mind in small snippets, if the dose is made homeopathically small, this quality (of massiveness) is not to be found and no matter how good the presentation may be, the feeling tone of the ideas will never be that of real experience."

"In school education there are thus two distinct factors: the influence of the master upon his pupils working through suggestion and imitation and the influence of the pupils upon one another working through imitation and emulation."

"For the educator to make good his claim as a moulder of character, it is, in the first place, necessary to show that ideas affect the direction of the will; that the line taken by a certain quantity of mental energy is determined by impulses and that these in turn are partly conditioned by ideas."

Explain and discuss the foregoing.

University of Toronto

FACULTY OF FORESTRY.

ANNUAL EXAMINATIONS
1912.

FOURTH YEAR.

FOREST ORGANIZATION.

Examiner—B. E. FERNOW, LL.D.

1. State in logical sequence the practical procedures in formulating a working plan and establishing a forest organization under sustained yield management.
2. Classify the different methods of budget regulation and give the essential features of each.
3. How is the maturity of timber determined?
4. What is the meaning of $\frac{400}{nd} = \frac{100}{a}$? Explain the meaning and derivation of the two expressions.
5. Discuss the practical views and the principles which govern in the districting of a forest property.
6. What are the conditions and what the use of the normal forest?

FOREST FINANCE.

Examiner—B. E. FERNOW, LL.D.

1. Develop the theory and pertinent formulas for three different methods of statical calculation.
2. What are the various credit and debit items in the soil rent formula; discuss their importance and relative influence on the soil rent.
3. Explain the different points to be ascertained and the various methods of determining the value, for purposes of a damage suit, of a stand destroyed by fire.
4. In a normal management class of 100 acres it costs \$15 per acre to plant, the cost for administration and taxes is \$1.50 per acre per year. There is an intermediate return of \$2.50 in the 20th year and a return of \$10 in the 40th year, and a final harvest value of \$400 can be secured in the 60th year. If left to grow to the 80th year an additional intermediate return of \$12.50 is

secured in the 60th year and the harvest value is increased to \$630. Which is the more advantageous felling age, by forest rent and by soil rent, if the business rate of interest is 3%? What is the soil value, the value of the wood capital and the interest rate earned on the latter?

5. A stand, 70 years old, has per acre a stock of 4,000 cubic feet worth 6 cents per cubic foot. Its current volume increment is 2.5%; its quality increment is 2%. The soil is valued at \$30; the administration requires 50 cents per year. Money is worth 5%. What is its index per cent? Is it ripe or not, if the demanded business rate is 3%?

FOREST PROTECTION.

Examiner—A. H. D. Ross, M.A., M.F.

1. Describe the different ways in which fire injures the forest, and discuss the influence of such factors as the time of year, ground cover, aspect of slope, wind, species, age of stand and silvicultural system.

2. What preventive measures may be adopted in the case of (a) Settlers clearing land (b) Railway locomotives and logging engines (c) Campers?

Under what circumstances would you advocate the erection of look-out stations and telephone lines?

3. Write notes on the fire-fighting organization and forest fire legislation in any two of the following provinces:—

(a) Nova Scotia (b) Ontario (c) The "Prairie Provinces" (d) British Columbia.

4. What information should be given in a description of forest boundaries, and what steps should be taken to prevent adverse possession?

5. Give an account of the protective measures usually adopted for the minimizing of damage caused by

(a) Frost in nursery beds and young plantations
(b) Wind Storms (c) Erosion (d) Shifting Sand (e) Insects
(f) Fungous Diseases.

PLANT PATHOLOGY.

Examiner—J. H. FAULL, Ph.D.

1. Name three factors predisposing to disease in plants.
2. What is meant by decay? Describe the conditions favoring decay in structural timber.
3. Describe one of the important fungi causing heart decay in trees, its life history, effect on the wood, and host trees on which it is found.
4. Give an account of the blister rust of white pine (*Cronartium ribicola*) and of the chestnut bark disease (*Diaporthe parasitica*).
5. What is blue stain? What kinds of wood are affected by it?
6. Describe either the mercury chloride process for treating wood, or one of the creosote cylinder processes.

APPLIED CHEMISTRY.

Examiner—W. H. ELLIS, M.A., M.B.

1. What is the percentage composition of cellulose? What is the empirical formula? What is known as to its constitution?
2. Describe the manufacture of one of the following cellulose products; artificial silk; filaments for incandescent lamps; gun cotton.
3. Discuss the statement: "Wood contains approximately 54 per cent of cellulose and 46 per cent of lignone." Upon what facts is this statement based? What is the empirical formula of lignone? What is the action of chlorine on lignone? What is the action of sulphurous acid on it?
4. What reagents are used in the manufacture of chemical wood pulp? What is the result of their action on the wood? What is the composition of chemical wood pulp? What advantage has it over mechanical wood pulp? What are the by-products in the manufacture of chemical wood pulp? What is done with them?

5. Give a short account of the products of the destructive distillation of wood, the methods of separating and purifying them and their uses.

6. How does "wood turpentine" differ from "gum turpentine?" How are they obtained? What are their uses?

7. What is the chemical composition of the Tannins? What are the principal varieties of Tannins? How are they distinguished? Mention some examples of each kind among commercial tannins and state the source from which each is derived.

POLITICAL ECONOMY.

Examiner—S. A. CUDMORE, B.A.

Five questions only to be answered.

1. What are the postulates of political economy, and how far are these applicable to the different stages of economic development?

2. Discuss the law of Diminishing Returns in its application to natural resources.

3. What factors influence the price of commodities in a competitive market? Discuss.

4. Account for the use of money in trade. Why has gold become the chief money-material of the world? Discuss fully.

5. Give an account of the Canadian Banking system and show how far it is specially adapted to the needs of this country.

6. Take, as an instance of protection, the export duty on pulp-wood, and show what you consider to be its advantages or disadvantages.

7. Outline the various theories of wages. Which do you consider the most nearly correct, and why?

8. What reasons would you suggest for the increased cost of living? Explain fully.

University of Toronto

FACULTY OF MUSIC.

ANNUAL EXAMINATIONS
1912.

FINAL YEAR.

HISTORY AND FORM.

Examiner—W. E. FAIRCLOUGH.

1. Give the names of composers associated with the early development of Form in Composition, with some particulars of each.

2. Give a description of the various Rondo forms. Write the melody of a subject in modern rondo form, and sketch a plan for the completion of the movement, naming the keys, modulations, etc.

3. Trace briefly the history of Sonata (first movement) form, giving the names of composers connected with its development from beginning to culmination.

4. Give some account of early attempts at musical notation. Who were the earliest writers on the subject of music?

5. Trace the growth of polyphonic music up to and including Palestrina. Give a description of Palestrina's art and style.

6. Write a short account of the evolution of the Piano-forte, and name several composers of Clavier music up to Bach.

7. Give an account of the life and works of Schumann. Compare him with his contemporaries. In what types of composition was he most successful, and what was the nature of his influence upon later composers?

8. Write brief notes on any six of the following: Rameau, Paganini, Berlioz, Boildeau, Gluck, Rheinberger, Saint-Saëns, Orlando Gibbons, Buxtehude, Morley, Di Lasso, Corelli.

ORCHESTRATION.

Examiner—H. A. WHEELDON, Mus. Bac. (Cantab.)

1. Score the following for full orchestra including four horns (two natural and two valve) two trumpets, three trombones, tympani, and the usual wind and strings.

Musical score for piano accompaniment. The score is written on three staves. The top staff is the right hand, and the bottom two staves are the left hand. The key signature is one sharp (F#) and the time signature is 3/4. The score begins with a piano (p) dynamic marking. The right hand plays a melodic line with various intervals and rests. The left hand provides harmonic support with chords and moving lines. The score concludes with a fermata over the final chord.

Musical score for strings. The score is written on three staves. The top two staves are the first and second violins, and the bottom staff is the violas and cellos. The key signature is one sharp (F#) and the time signature is 3/4. The score begins with a mezzo-piano (mp) dynamic marking. The strings play a rhythmic pattern of eighth and sixteenth notes, with some longer notes in the lower registers. The score concludes with a fermata over the final chord.

Musical score for woodwinds and brass. The score is written on three staves. The top staff is for woodwinds (flutes, oboes, clarinets, bassoons), the middle staff is for trumpets and trombones, and the bottom staff is for horns. The key signature is one sharp (F#) and the time signature is 3/4. The score begins with a fortissimo (ff) dynamic marking. The woodwinds play a melodic line with various intervals and rests. The brass instruments provide harmonic support with chords and moving lines. The score concludes with a fermata over the final chord.

A musical score for piano, consisting of three staves. The top two staves are grouped with a brace on the left. The music is in a key with one sharp (F#) and a common time signature (C). It features intricate melodic lines with many slurs and ties, and a bass line with sustained notes and some rhythmic patterns.

A musical score for piano, consisting of three staves. The music is in a key with one sharp (F#) and a common time signature (C). It features a melodic line with slurs and ties, and a bass line with sustained notes. Dynamic markings include *mp* (mezzo-piano) and *rit.* (ritardando). The piece concludes with a cadence.

2. Score the following cadence for (a) strings only (b) woodwind, (c) brass.

A musical score for piano, consisting of two staves. The music is in a key with one sharp (F#) and a common time signature (C). It features a melodic line with slurs and ties, and a bass line with sustained notes. Dynamic markings include *mp* (mezzo-piano) and *rit.* (ritardando). The piece concludes with a cadence.

3. What instruments employ wholly or partially the tenor clef?

4. Give the compass of the Contra Fagotta. When was it first used? Why should it be used sparingly?

HARMONY.

Examiner—J. HUMFREY ANGER, MUS. DOC.

A.

A

1. The above passage is the Bass of one of J. S. Bach's chorales. Discover the melody, or an appropriate melody, and add three inner parts (five parts in all). Write in open score.

2. Write a passage of modulation, in pastorale style (6-8 time), commencing in the key of F-major, passing through the keys of D-major, B flat minor and B-major, and ending in the original tonic. Exemplify four different kinds of modulation.

3. To the following melody for the violin, add parts for the viola and violoncello. Insert bow marks; modulate to the key of the mediant major at X, and imbue the under parts with contrapuntal interest.

B

B.

4. Name the following chords, all as strictly in the key of B-flat; and compose a long metre hymn tune, introducing them. The chords may be employed in any order, but there must be no modulation.

c (a) (b) (c) (d) - (e) (f) (g) (h)

C.

5. Mention any instances of departures from the strict laws of harmony in the works of classical composers; and give examples of consecutive fifths, false relations, irregular resolutions, etc., to which there is little or no objection.

COUNTERPOINT.

Examiner—H. A. WHEELDON, Mus. Bac. (Cantab.)

1. To the following canto Fermo add a Bass in the second species (two parts).

1

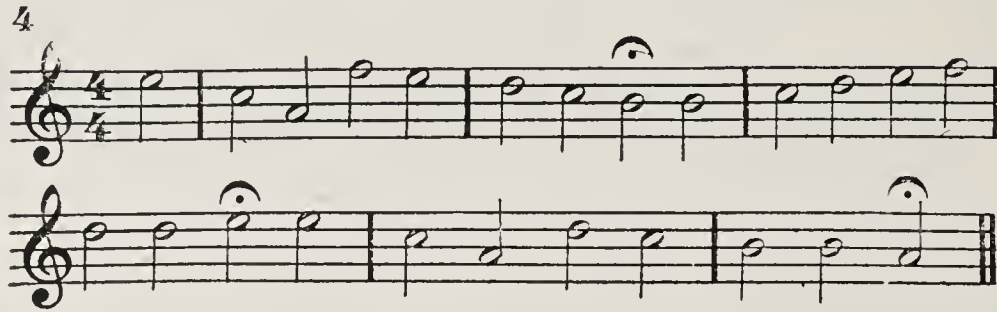
2. To the following Canto Fermo add a Treble in the fourth species and a Bass in the third species (three parts).

2

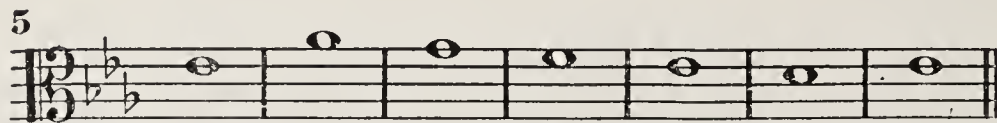
3. To the following Canto Fermo add parts for Treble, Alto, and Tenor each in the fifth species (four parts).



4. Add four parts below the following Chorale, all in the first species (five parts). A modulation to the relative major should be made in the second strain.



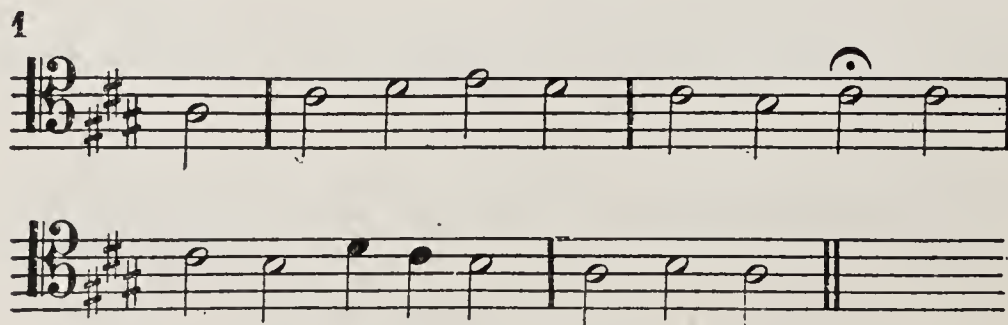
5. Add a Treble and a Bass both in free counterpoint to the following canto fermo making use of imitation.



DOUBLE COUNTERPOINT. CANON AND FUGUE.

Examiner—W. E. FAIRCLOUGH.

1. To the following subject add a double counterpoint invertible at the twelfth.



6. Briefly describe the mean-tone system of temperament.

7. In what respect does a rise in temperature affect orchestral instruments?

8. Compare the oboe and clarinet in regard to the shape of tube and overtones.

9. Can any analogy be said to exist between the colors of the rainbow (spectrum) and the notes of the natural scale.

10. Given $B = 240$, find the vibration number of each note in the harmonic form of the scale of B-minor.

PRACTICAL MUSIC.

Examiners { W. E. FAIRCLOUGH, F.R.C.O.
A. WHEELDON, Mus.Bac.

1. Play the portions asked for, of the following compositions:

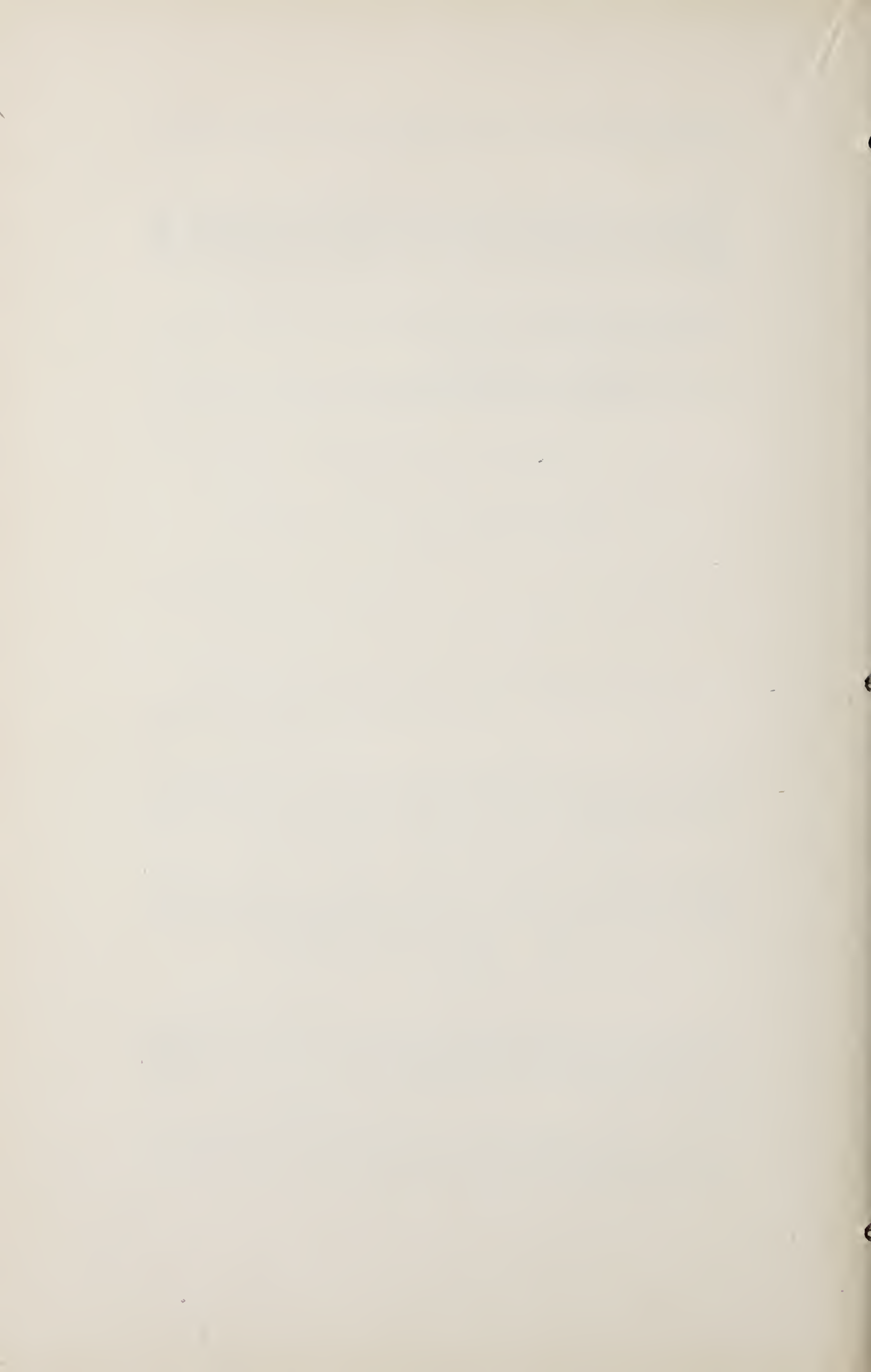
(a) Mozart, Andante, un poco Adagio, from Sonata in C.

(b) Tschaiikowsky, Mazurka, from op. 39.

2. Transpose the following passage (from Schumann's Blondel's Lied) into the key of F:

2. *Moderato.*

The musical score is written for piano in G major (one sharp) and common time. It consists of two systems of two staves each. The first system begins with a piano (*p*) dynamic, followed by a mezzo-forte (*mf*) section, and ends with a piano (*p*) section. The second system continues the piece and concludes with the word "etc.".



University of Toronto

FACULTY OF LAW.

ANNUAL EXAMINATIONS
1912.

FOURTH YEAR.

THE UNIVERSITY OF CHICAGO

PHYSICS DEPARTMENT
1975

PHYSICS 309

TORTS.

Examiner—HAROLD W. A. FOSTER, LL.B.

NOTE—Pass candidates *omit last two questions.*

1. Explain and illustrate the maxim “*actio personalis moritur cum persona*” and the effect thereon of the Statute known as Lord Campbell’s Act.

2. Discuss shortly the principles underlying a master’s responsibility for the torts of his servants.

3. “*Volenti non fit injuria.*” Explain the maxim and give examples.

4. Explain the legal fiction upon which the action of seduction is based and its consequences.

5. Distinguish “libel” and “slander” and explain the importance of the distinction with reference to damages recoverable.

6. Explain and illustrate:

(a) *Trespass ab initio.*

(b) *Res ipsa loquitur.*

7. Discuss fully the doctrine of contributory negligence, and give examples.

8. Discuss and illustrate the question of common employment in relation to a master’s liability to his servants.

9. What is the rule as to the measure of damages in actions of tort?

10. Discuss shortly what Pollock calls “inevitable accident” and give examples.

REAL PROPERTY.

Examiner—JOHN D. FALCONBRIDGE, M.A., LL.B.

NOTE—Pass candidates omit questions 9 and 10.

1. Write brief notes on the terms socage, borough English, gavel-kind.

2. In what different ways may a right of way be acquired? Illustrate.

3. Discuss the liability of a life-tenant for waste.
4. When is a widow entitled to dower in legal and equitable estates respectively? Illustrate.
5. Discuss the right to possession of mortgaged land as between mortgagor and mortgagee.
6. What is a contingent remainder? Distinguish it from (a) an executory devise, and (b) a vested remainder. Illustrate.
7. Explain briefly the operation of (a) a covenant to stand seized, (b) a bargain and sale, (c) a lease and release.
8. A grants land to B without words of limitation. What estate would have been conveyed at common law, and what estate is conveyed at the present time?
9. Distinguish *feudum* from *allodium*. Discuss briefly the nature, descent and alienation of feuds according to Blackstone.
10. Explain briefly the changes effected in the descent or devolution of real estate (a) by the Inheritance Act (15 Vict. c. 6), (b) by the Devolution of Estates Act.

COMMERCIAL LAW.

Examiner—JOHN D. FALCONBRIDGE, M.A., LL.B.

NOTE—Pass candidates omit questions 9 and 10.

1. Where there is a contract for the sale of specific goods, and subsequently the goods wholly perish while still in the possession of the seller but without any fault on the part of either seller or buyer, what are the rights of the parties? Reasons.
2. What constitutes “acceptance” of goods by the buyer (a) such as will take the case out of the Statute of Frauds, and (b) such as will preclude the buyer from setting up that the goods are not equal to sample? Illustrate.
3. What are the remedies of the seller of goods against the buyer who refuses to accept or pay for them? Discuss the measure of damages.

4. What is stoppage in transitu? How may the right be exercised? When does the transit end for this purpose?

5. How is a cheque defined by the Bills of Exchange Act? What are the more important differences between a cheque and a bill of exchange? Illustrate.

6. Explain and illustrate the following modes of acceptance of a bill: (a) general, (b) conditional, (c) partial. What kind of acceptance is an acceptance to pay at a particular specified place?

7. What constitutes valuable consideration for a bill or note? In what respect does the case differ from that of an ordinary simple contract?

8. A note is payable at the Lawyers Bank of Canada, Toronto, on the 28th January, 1912. It is endorsed by the payee to a holder in due course. It is not paid at maturity and notice of dishonour is duly given to the payee. The holder does not present the note for payment at the Bank until the 15th February. The ledger keeper then says that he has no instructions to pay, and the holder on the following day sues the maker and the endorser. Is he entitled to succeed? Why?

9. What is meant by the delivery of goods "on sale or return"? Compare with delivery on approval and with a sale with option to return in a given event. Whose is the risk of loss pending the notification of approval, intention to return, etc.?

10. A cheque is marked by the drawee bank at the instance of the drawer and is then delivered to the payee, who deposits it at once in his own bank. On the following day before the cheque is presented for payment through the clearing house the drawee bank fails. What are the rights of the parties? Would the result be different if the cheque had been marked at the instance of the payee after delivery to him? Reasons.

INTERNATIONAL LAW.

Examiner—HAROLD W. A. FOSTER, LL.B.

Pass Candidates omit last two questions.

1. In what respects according to English law is the question of the validity of a marriage governed by the

(a) *Lex loci actus*.

(b) *Lex personalis*.

2. Explain
 - (a) Doctrine of Renvoi.
 - (b) Domicile.
 - (c) Naturalization.
 - (d) Denization.
 - (e) Lex Fori.
3. Explain and criticise the doctrine relating to domicile enunciated in the case of "Moorehouse *vs.* Lord".
4. Discuss the pleading of "Res Judicata" in an action in Canada upon a Judgment obtained in the United States of America.
5. Can a plaintiff recover damages in Canada for an act committed in one of the United States of America constituting a tort in Canada, but which by the law of the State in question is not a Tort? and *vice versa*?
Explain fully and give examples.
6. Discuss the doctrine of "extraterritoriality", giving examples.
7. Explain the question of the laws governing the legitimation of a child per subsequens matrimonium and give examples.
8. State what laws govern succession at death to
 - (a) land
 - (b) movables.
9. Is a defendant's residence in England sufficient to give jurisdiction to English Courts in a suit
 - (a) for a declaration of nullity?
 - (b) for a divorce a vinculo?Discuss fully.
10. Explain the laws governing the validity of a contract made in France where suit is brought thereon in an English Court and give examples.

CORPORATIONS ULTRA VIRES.

Examiner—HAROLD W. A. FOSTER, LL.B.

Pass Candidates omit last two questions.

1. Distinguish Co-owners, a Partnership, and a Corporation.
2. Discuss briefly a Corporation's power (a) to borrow money; (b) to hold land; (c) to forfeit shares.

3. Explain fully the liability of Corporations for torts committed by their agents.

4. Explain the terms "floating charge," "debenture" "eminent domain," "constating instruments."

5. Discuss the meaning to be given the word "profits" referring in your answer to the decision in the case of *Lee vs. Newchatel Asphalte Company*.

6. Discuss the powers of Corporations to deal in (a) shares of other Corporations; (b) their own shares.

7. What is the position of a Corporation with regard to contracts which purport to have been made on its behalf before incorporation?

8. Distinguish "ultra vires" from "illegality."

9. Owing to pressure by creditors, a Railway Company is obliged to divert its revenue (which would otherwise have been available for dividends) for the payment of capital expenses. The Company proposes to allot preference stock at par to each shareholder to an amount equal to the dividend which would have been payable to him if the revenue had not been diverted for capital purposes. Would this be ultra vires of the Company?

Discuss shortly and state rule applicable as enunciated by Brice.

10. A Company by the terms of its charter has authority to mortgage real and personal estate; the directors borrow money on a mortgage of its uncalled capital. Is this ultra vires of the company? Explain.

CONSTRUCTION OF STATUTES.

Examiner—HAROLD W. A. FOSTER, LL.B.

NOTE—Pass Candidates *omit last two questions*.

1. Explain and illustrate the maxims:

(a) *ut res magis valeat quam pereat.*

(b) *generalis specialibus non derogant.*

(c) *reddendo singula singulis.*

(d) *noscitur a sociis.*

2. State the rule in Heydon's case.

3. What sources of information outside a Statute may be used to throw light upon its meaning?

4. Explain and illustrate:
 - (a) The "ejusdem generis" rule.
 - (b) Statutes in pari materia.
5. Enumerate the various parts of a modern Statute, and discuss shortly their value as an aid in construing the Statute.
6. For what purposes is express language in Statutes absolutely indispensable?
7. What is meant by:
 - (a) A private act.
 - (b) A penal act.Do the rules for their construction differ from the rules for the construction of a public Act? Explain.
8. Distinguish "retrospective" and "ex post facto" legislation, and give examples.
9. What is the effect of a Statute providing a new remedy for a breach of common law right upon the previous common law remedy?

Give the rule applicable in such a case and explain.
10. Discuss the liability of public bodies to actions in respect of breaches of statutory duties.

CRIMINAL LAW.

Examiner—JOHN D. FALCONBRIDGE, M.A., LL.B.

NOTE: Pass candidates omit questions 9 and 10.

1. Explain and illustrate "excusable homicide" and "justifiable homicide".
2. Illustrate principal in the first degree, principal in the second degree, accessory before the fact, accessory after the fact respectively. What is the position of these parties under the Code?
3. Distinguish embezzlement from larceny at common law. Illustrate. How are these crimes dealt with under the Code?
4. What provision does the Code make in regard to common law defences to a crime? Illustrate the application of the Act.

5. What crime is committed by a person who, with intent to steal (a) gains entrance to a house through an open outer door and then breaks open the door of a room; (b) gains entrance to a room by raising a window already partly open?

6. A Bank president signs and sends to the government, a statement respecting the affairs of the Bank, the contents of which he knows to be false, and intending thereby to mislead the government. Is he guilty of the crime of forgery or of any other indictable offence under the Criminal Code? Reasons.

7. Under what circumstances is it an indictable offence to make a contract for the purchase of stock in an incorporated company with the intent to make a profit by the rise in the market price of such stock? Explain.

8. Two shipwrecked persons, by swimming, reach at the same moment a block of ice which is capable of supporting only one person. Both will die of cold if they remain in the water. One person forceably pushes the other away, climbs on the ice and is subsequently rescued. The other dies before help comes. Of what crime, if any, is the survivor guilty? Reasons.

9. Is it under any circumstances a crime, under the law of Canada, for a person having a wife in Canada to go to New York and there marry again? Discuss this question with reference to the limitations on the power of the Dominion Parliament and any decided cases on this subject.

10. What are the provisions of the code in regard to insanity or delusions as a defence to a criminal charge? What was the Common Law? What is the effect of acquittal on the ground of insanity?

DOMESTIC RELATIONS.

Examiner—JOHN D. FALCONBRIDGE, M.A., LL.B.

NOTE:—Pass candidates omit questions 9 and 10.

1. Discuss the validity of a condition in restraint of marriage. Give examples of valid and of invalid conditions.

2. Discuss the possible defences open to a man who is accused of bigamy, the second alleged marriage having been solemnized in the jurisdiction where the charge is laid.

3. Two British subjects desire to marry each other in France. What choice of forms of marriage have they in order that the marriage may be valid in England?

4. State briefly the effect of Lord Hardwicke's Act, 26 G. 2, c. 33.

5. What are the rights of a ward after attaining the age of 21 years (*a*) in regard to property held by his guardian for him, (*b*) in regard to past transactions, (*c*) in regard to gifts by the ward to his guardian?

6. What is (*a*) the liability of a father for torts committed by his child, (*b*) the right of the father to sue in respect of torts to his child?

7. What are the rights and obligations of parents in regard to (*a*) the custody, (*b*) the support, (*c*) the education of a child?

8. Discuss the validity of an agreement for separation of husband and wife.

9. For what purpose was a consensual marriage valid by the common law of England?

10. State the rules of construction applied to marriage articles. Explain how the real intention of the parties may be carried out by a "strict settlement."

University of Toronto

DEPARTMENT OF DENTISTRY.

ANNUAL EXAMINATIONS
1912.

THE UNIVERSITY OF CHICAGO

PHYSICS DEPARTMENT
5712 S. DICKINSON DRIVE
CHICAGO, ILL. 60637

SOPHOMORE CLASS.

ANATOMY.

Examiner—CHAS. B. SHUTTLEWORTH, M.D., C.M.,
F.R.C.S., Eng.

1. Name the foramina in the middle fossa of the skull. Mention the structures which pass through each.
2. Trace the facial (external maxillary) artery from its origin to its ultimate distribution.
3. Name the muscles attached to the mandible (inferior maxilla) and give the nerve supply of each.
4. Give, in detail, the nerve supply of the teeth also describe their blood supply.
5. Give a description of the glosso-pharyngeal (9th cranial) nerve after its exit from the skull.

JUNIOR AND SOPHOMORE CLASSES.

ORGANIC AND PHYSIOLOGICAL CHEMISTRY.

Examiner—W. CECIL TROTTER, B.A., D.D.S.

1. How may the presence of Carbon, Nitrogen and Sulphur be detected in organic compounds?
2. Describe the general properties of alcohols, and give their most characteristic reactions.
3. Write equations for the preparation of analine from benzene, and describe its most important properties.
4. What tests will distinguish starch, glucose and cane sugar?
5. Describe with details how you would show that the bacteria present in the mouth produce lactic acid from carbohydrates.
6. Describe process for ascertaining the general composition of saliva.

JUNIOR CLASS.

PHYSIOLOGY.

Examiner—F. ARNOLD CLARKSON, M.B.

1. (a) Write a short note on internal secretion.
(b) Explain clearly the meaning of hormone, enzyme and kinase, with examples of each.
2. Describe fully the act of swallowing.
3. (a) What changes does food undergo in the colon?
(b) Name the intestinal ferments and give the action of each.
4. Write a short note on the physiology of the ear.
5. Tell what you know about the blood.

JUNIOR CLASS.

THERAPEUTICS.

Examiner—C. E. SALE, D.D.S., M.D.S.

1. Give the different stages of anaesthesia in the administration of chloroform.
Describe the preparation of a patient for a general anaesthetic.
2. Name and describe the five parts of a prescription.
In prescription writing to what points should special attention be paid?
3. Give symptoms and antidotal treatment of:
 1. Nitrous oxide poisoning.
 2. Chloroform (general Anaesthetic) poisoning.
 3. Cocaine poisoning.
4. Give Source, Dose, Classification, and use in Dentistry of:
 1. Nitrate of Silver.
 2. Morphine.
 3. Capsicum.
 4. Cresol.
 5. Digitalis.
 6. Magnesii Sulphas.

7. Lysol.
8. Iodine.
9. Nux Vomica.
10. Quininae Sulphas.

Define:

1. Nutritional Tonic.
2. Restorative Tonic.
3. Diaphoretic.
4. Cathartic.
5. Sedative.
6. Alterative.
7. Stimulant.
8. Volatile Oil.
9. Detergent.
10. Hemostatic.

JUNIOR CLASS.

OPERATIVE DENTISTRY.

Examiner—W. J. FEAR, L.D.S.

1. Point out the dangers of the metal separator and state how these dangers may be avoided.
2. Give the classification of cavities, and state the difference in the *modus operandi* of decay in smooth surface cavities, and in pit and fissure cavities.
3. Give the advantages and limitations of the gold inlay.
4. Under what circumstances should a porcelain inlay be used? and why?
5. How would you prepare a cavity where the dentine was extremely sensitive?
6. Tell where you would use a combination of platinum-and-gold in filling teeth, and why?
7. If the proximo-incisal angle of an incisor is gone how would you prepare the cavity for the most permanent filling? (do not describe process of filling).
8. If you found a mouth in which the teeth were extremely susceptible to decay, how would you proceed to change the condition to one of immunity?

JUNIOR CLASS.

PROSTHETIC DENTISTRY.

Examiner—A. V. LESTER, L.D.S., D.D.S.

1. Give different forms of the arch for pure type of each temperament.
2. Write a brief note on the considerations affecting the choice between a partial denture and a bridge in the mouth of a patient.
3. In a full denture, give three suggestions for varying the normal arrangement of the upper anterior six teeth.
4. What course of treatment would you lay out for a patient wearing a full upper denture of vulcanite and suffering from a so-called rubber sore mouth.
5. Describe the different positions the teeth assume in the act of mastication.
6. (a) What are the advantages claimed for removable bridges, where such are indicated.
(b) Give one method of constructing a piece of removable bridgework.
7. Patient, a lady of refinement, having lost superior right central wishes to have a bridge inserted displaying no gold whatever. Describe the bridge.
8. Discuss briefly the possibilities of the principles of anatomical articulation, in dental restorations, other than full upper and lower.

SENIOR CLASS.

ORTHODONTIA.

Examiner—C. A. KENNEDY, L.D.S., D.D.S.

1. Give meanings for following: orthodontia, occlusion, rotate, labioversion.
2. Give steps taken and instructions given at first three interviews with a patient for orthodontic treatment.

3. Give correct occlusion for:

- (a) Lingual cusp of lower left 1st bicuspid.
- (b) Mesio-buccal cusp of right sup 2nd molar.
- (c) Lower left cuspid.
- (d) Mesio-buccal incline plane of mesio-Lingual cusp. of lower left 3rd molars.

4. Patient age 12: Lost superior deciduous cuspids prematurely. All permanent teeth have erupted except superior permanent cuspids. The inferior teeth have developed normally, while the superior molars and bicuspid are in mesial relation to the inferior; the superior laterals and first bicuspid touching. Give treatment.

5. Describe the physiological change which takes place when a tooth is rotated.

SENIOR CLASS.

SURGERY.

Examiner—A. E. SANTO, L.D.S., D.D.S.

1. Describe the process of repair which takes place in blood vessels, connective tissue and muscular tissue in the healing of an incised wound.

2. (a) Give treatment of severe arterial hemorrhage from socket of 2nd lower molar, opposing tooth in upper jaw absent.

(b) Distinguish between Arterial, Venous and Capillary hemorrhage.

3. (a) In what respect is the oral cavity considered an ideal place for the growth of bacteria?

(b) What effect has a septic condition of the oral cavity upon the Gastric function of the body.

4. Define briefly Aneurism, Sequestrum, Osteomyelitis, Hypertrophy, Crepitus, Arthritis, Ankylosis.

5. Abscess of Antrum.

Give causes, symptoms and treatment.

6. (a) Describe the process of the formation of an abscess in the soft tissues.

(b) Give treatment.

7. Give the local and general symptoms of inflammation and explain to what each symptom is due.

8. State some of the distinguishing features of malignant and non-malignant tumors, respectively.

9. Describe the different symptoms of secondary stage of syphilis manifested in the oral cavity.

SENIOR CLASS.

MEDICINE.

Examiner—C. F. WALT, D.D.S., L.D.S.

1. What value in diagnosis has

(a) The Pulse

(b) The Temperature.

2. Explain the value of the following agents in the treatment of inflammatory conditions

(a) Heat

(b) Cold

(c) Cathartics.

3. What preventive measures are of most value in guarding against Shock and Collapse during dental operations?

4. State clearly how pathological conditions throughout the body may be due to a diseased condition of the oral cavity.

Make reference to any particular case which may have come under your observation.

5. Give differential diagnosis of Tuberculosis and Syphilis as found affecting the oral cavity.

SENIOR CLASS.

HISTORY AND ETHICS OF DENTISTRY AND JURISPRUDENCE.

Examiners { G. M. HERMISTON, B.A., D.D.S.
GEO. SILVERTHORNE, M.B.

A.

1. Compare the histories of the Art of Dentistry in America and Europe during the 19th Century.

2. Name the different forms of gold used for restoring lost portions of natural teeth—give the history of their introduction and compare their respective merits.

3. Sketch the history of Porcelain in its application to Dentistry both for inlays and crowns.

4. Give the history of Silicate Cements, compare their merits with the merits of other plastic filling materials.

5. A patient presents with a very considerable amount of restoration needed on the natural teeth and also requiring some substitutes, your fee for such work is asked. What shall be your answer? Give sufficient reason.

6. In your practice of Dentistry to what extent is environment, *i. e.*:

(a) the conduct of your confrères in your town or city to regulate your own practice? Give definite reasons for your answer.

(b) Outline a Code of Ethics for the Dental Profession.

B.

1. Define 'expressed' and 'implied' contracts in relation to the practice of Dentistry and give examples.

2. What is the legal position of a qualified Dentist in Ontario as to the administration of local and general anaesthetics?

3. Discuss generally Malpractice in regard to Dentistry.

SENIOR CLASS.

SCIENCE AND PRACTICE OF DENTISTRY. (OPERATIVE.)

Examiner—F. T. COGHLAN, L.D.S., D.D.S.

1. A child 8 years of age comes to you, with the first inferior permanent molars so badly decayed that the crowns are almost level with the gums. The pulps are exposed, and giving pain. The deciduous molars are all

in place, but have large cavities, and putrescent pulps. There are no depressions in the morsal surfaces of the permanent molars sufficient to hold a devitalizing application, and the pulps will not respond to an application of cocaine under pressure, and the child is of nervous temperament.

Describe what you will do to restore the mouth to health.

2. You are consulted by a young mother and on examination you find her teeth highly sensitive and somewhat chalky around the gingival and cervical margins, the inferior cuspids and bicuspid having cavities in these positions.

(a) Describe fully what you would do for her.

(b) What would be your advice to her? if any.

3. A middle aged woman suffering intense pain in the upper part of the right side of the face, applies to you for relief. You find the superior, right, 1st molar has been treated 10 months previous, and had the pulp removed, and the roots filled from a mesio-approximal cavity which is filled with alloy. It has apparently never given any trouble, and is not sore to percussion now. She has had no pain until a week ago. Since that time she has had severe attacks every few hours, sometimes lasting only a few minutes, and other times of much longer duration.

Diagnose.

Give cause and treatment.

4. A male patient, 45 years of age, consults you. You find, on examination, that nearly all the enamel is off the labial surfaces of the superior cuspids, and centrals, and they are very sensitive to thermal changes. His other teeth are apparently all in good condition. There is no decay in the centrals or cuspids, and the affected surfaces present a smooth, polished appearance.

(a) Tell what you know of the cause of this condition.

(b) What can be done to stop it?

(c) How would you repair affected teeth?

5. (a) What anaesthetics are used in your profession?

(b) What conditions contra-indicate the use of each?

(c) What precautions would you take before, after, and during the administration of each?

SENIOR CLASS.

THE SCIENCE AND PRACTICE OF
DENTISTRY.

(PROSTHETIC.)

Examiner—F. T. COGHLAN, L.D.S., D.D.S.

1. A lady, 24 years of age, comes to you, with the four superior incisors removed. The Cuspids are in perfect condition, and all the other teeth are in good repair. You are at liberty to do as you think best for the restoration of the lost organs. Describe fully what you would do, giving detail of construction.

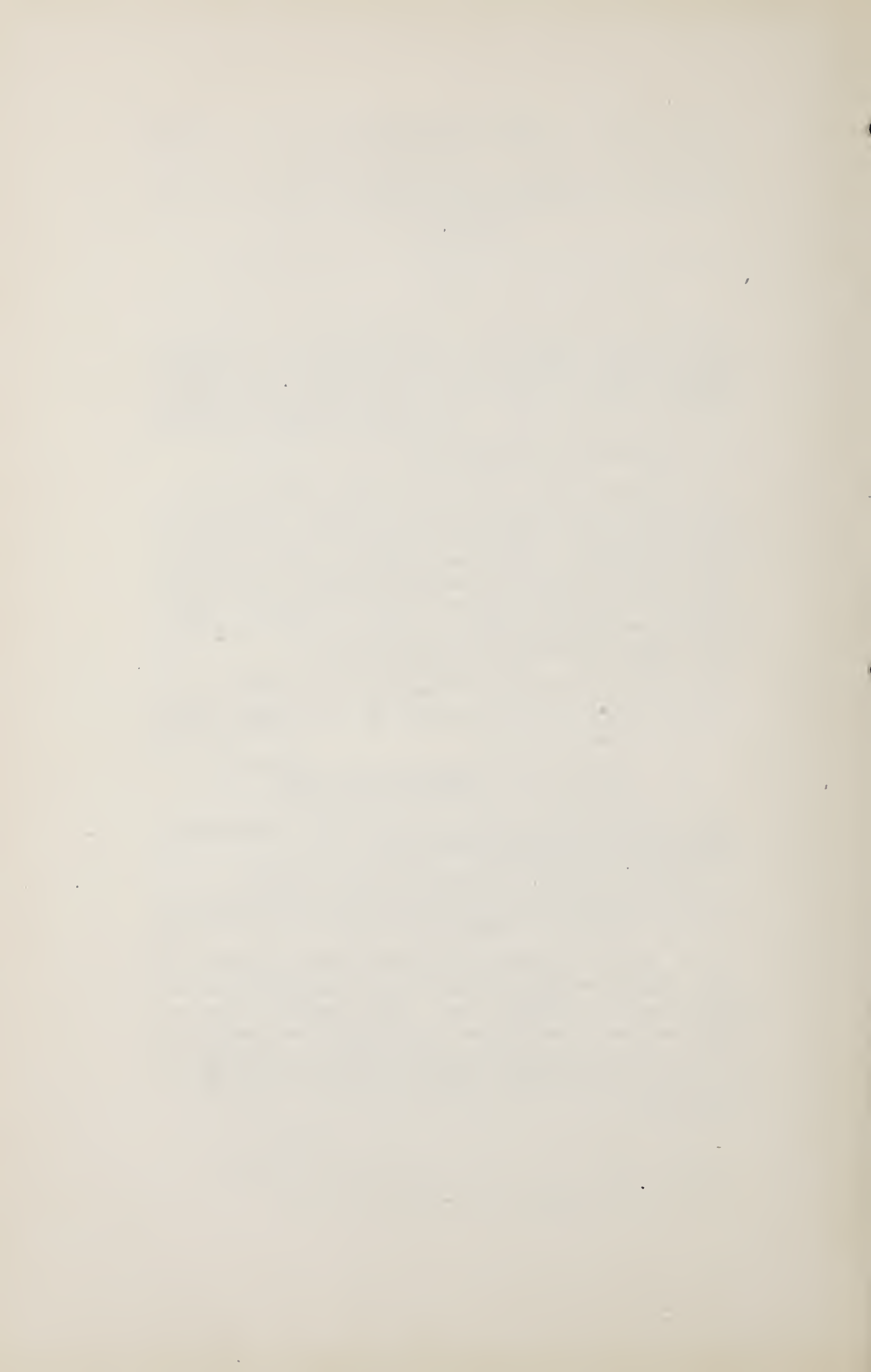
2. A patient, male, 35 years of age, comes to you. He has lost, by extraction, the superior laterals and second bicuspid. All the other teeth are in position and in good condition. The lower anterior teeth articulate very closely behind the superior incisors and are in contact with the upper gums, when the jaws are closed. He does not want a display of gold, if it can be avoided. How would you replace the lost organs?

3. (a) Give the full use of Electricity in dentistry.
(b) Describe the meaning of the terms: Volt, Ampere, Watt.
(c) Describe the installation of appliances in a properly equipped operating room.

4. A middle aged woman has lost all her teeth except the incisors and cuspids in each arch.

- (a) How would you supply the lost organs?
(b) Describe the means of retention you would use to make it most satisfactory.

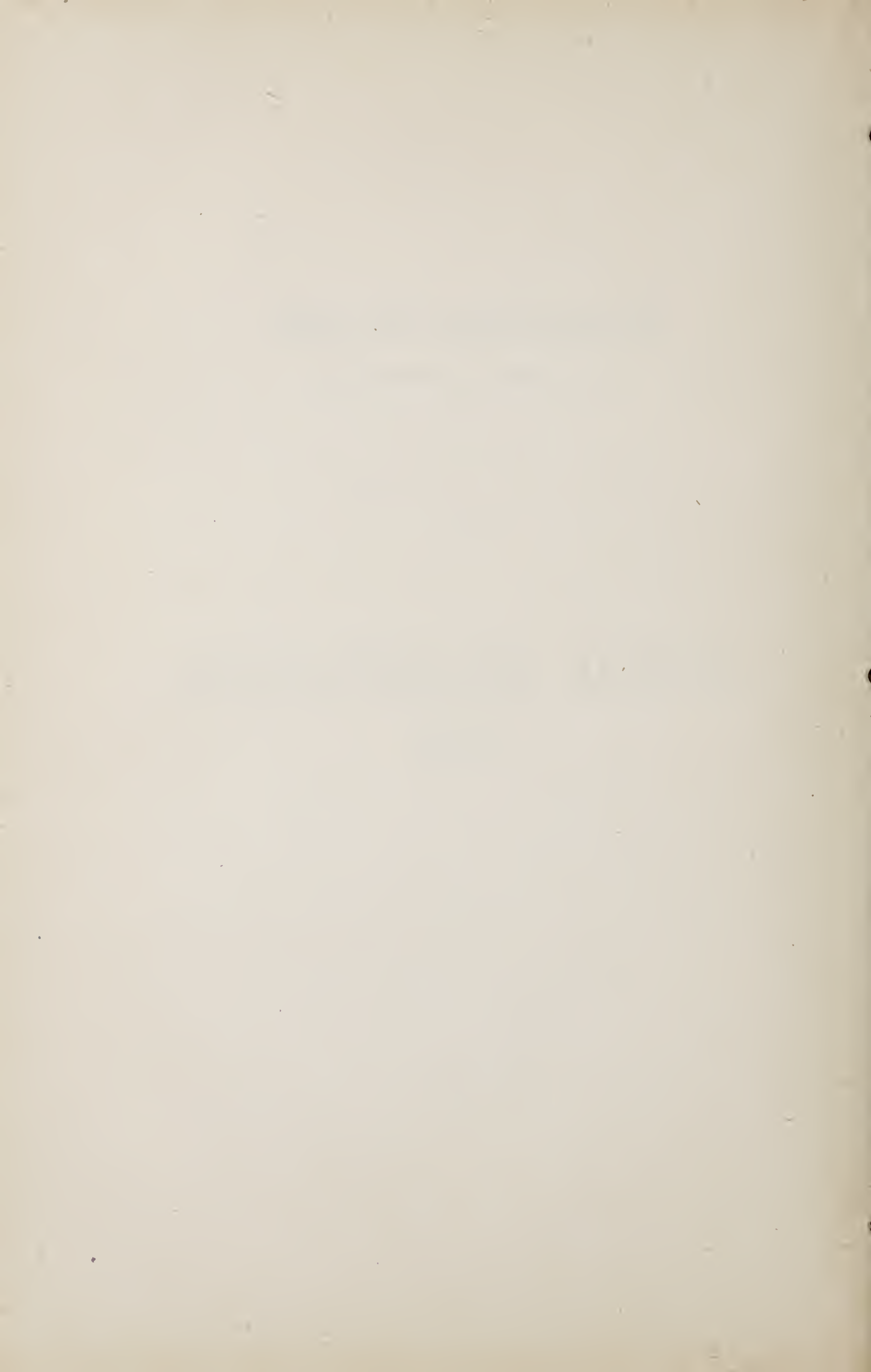
5. A patient requires all his teeth removed, and full upper and lower dentures inserted. He has a very small, flat, superior, maxillary arch. He does not want to suffer any more pain than is absolutely necessary, and expects the best service you can render, regardless of fee. Give appointments, and state what you would do each time.



University of Toronto

DEPARTMENT OF PHARMACY.

ANNUAL EXAMINATIONS
1912.



BOTANY.

Examiner—PAUL L. SCOTT, M.B.

1. Mention the various functions of roots; describe the process of absorption by the root tip and the structure of the tissues involved.
2. Describe—using diagrams—the characteristic features of any natural order you have studied.
3. State what you know of Mendel's theory of heredity as applied to plants.
4. Enumerate the chief differences between Monocotyledons and Dicotyledons.
5. Describe the structure of a young plant cell and the functions of its various parts.
6. Describe the general characters of the Fungi.

PRACTICAL BOTANY.

Examiner—PAUL L. SCOTT, M.B.

Describe fully, illustrating by diagrams, each of the specimens submitted.

CHEMISTRY.

Examiner—GEO. A. EVANS, Phm.B.

1. How would you prepare: (*a*) Lead Iodide; (*b*) Mercuric Oxide (yellow); (*c*) Strontium Bromide; (*d*) Ethyl Nitrite; (*e*) Iodoform.
2. Write an account of the chemistry of Hydrogen Sulphide.
3. Give equations illustrating the interaction between:
 - (*a*) Hydrochloric Acid and Sodium Salicylate;
 - (*b*) Lead Acetate and Zinc Sulphate;
 - (*c*) Silver Nitrate and Sodium Tartrate;
 - (*d*) Ammonium Chloride and Potassium Hydroxide;
 - (*e*) Ferric Chloride and Potassium Iodide.

4. A solution contains Barium, Calcium and Magnesium. How may these metals be detected and separated from each other?

5. Explain the Periodic Law, referring especially to the properties of Nitrogen, Phosphorus, Arsenic, Antimony and Bismuth.

6. By means of diagrams explain clearly how a combustion analysis may be carried out for the quantitative estimation of the elements of an organic compound containing Carbon, Hydrogen and Oxygen.

On analysis .4 gm. of such a substance gave .7652 gm. CO_2 and .4695 gm. H_2O . The vapour density compared to Hydrogen was found to be 23. Calculate the molecular formula of the compound.

PRACTICAL CHEMISTRY.

Examiner—GEO. A. EVANS, PHM.B.

1. Detect Alkaloid in substance marked A.
2. Detect Bases and Acids in substance marked B.

MATERIA MEDICA.

Examiner—A. MOIR, M.R.C.S.

Value.

- 15 1. Mention three drugs commonly used as bitter stomachics and give the official preparations of each.
- 15 2. Name the active principles of the following drugs, with dose of each: Elaterium, Aconite, Calabar Bean, Belladonna and Jaborandi (where there is more than one active principle, give the most important only).
- 20 3. Describe briefly a good sample of Red Cinchona bark. How would you distinguish it from the other varieties of Cinchona, and what are the B.P. requirements for the bark used in making the official preparations?

- 15 4. From what is Pepsin obtained? How should it be prescribed, and when should it be taken, to produce the maximum effect? Write a prescription containing it, with directions suitable for an adult.
- 15 5. Name the ingredients in the following B.P. preparations: Dover's Powder, Mercury with Chalk, Black Draught, Liquor Strychnia, and Aromatic Spirits of Ammonia.
- 20 6. Give the strength of each of the following preparations, with dose of those to be used internally:—
- Tincture of Nux Vomica,
 - „ Belladonna,
 - Liniment of Chloroform,
 - „ Opium,
 - Liquor Epispasticus,
 - „ Potassae,
 - Emplastrum Plumbi,
 - Emplastrum Cantharidis,
 - Compound Mercury Ointment,
 - Atropine Ointment.

PHARMACOGNOSY.

Examiner—A. MOIR, M.R.C.S.

Value.

- 30 1. Identify the gross specimens submitted.
- 30 2. Examine carefully and describe briefly microscopical specimens *A* and *B*.
- 40 3. Oral.

PHARMACY.

Examiner—CARL FREDERIC HEEBNER, Ph.G., Phm.B.

1. Æther Purificatus. State how it is prepared, (giving reasons for each step), specific gravity, boiling point, strength, impurities to be tested for, precautions to be taken when dispensing it, and how it should be stored. What is "A.C.E. Mixture."

2. State how the preparations of Virginian Prune are made, explaining fully each feature. Why is glycerin used as well as sugar in preparing the Syrup.

3. How are the following affected by exposure to air and light: (a) Santonin, (b) Potass. Hydroxide, (c) Lime water, (d) Sal Soda, (e) Gregory's Powder, (f) Resorcin, (g) Goulard's Extract, (h) Glycerin, (i) Sulphurous Acid, (j) Sulphuric Acid, (k) Potass. Hypophos. (l) Chloroform.

4. (a) Why are the following used: (a) ammonium carbonate in preparing Spt. Ammon. Aromat., (b) oleic acid in Ung. Cocainæ, (c) potassium iodide in Tinct. Iodi, (d) cold water in Infus. Quassiæ, (e) tartrated soda in the assay of cinchona, (f) mucilage of tragacanth in Black Wash, (g) mercuric chloride in Yellow Wash.

5. Give the strength of each of the following: (a) Liq. Hydrarg. Perchlor., (b) Liq. Atropinæ, (c) Battley's Sedative, (d) Magendie's Solution, (e) Lin. Opii, (f) Ext. Bellad. Liq., (g) Spt. Ætheris Nitrosi, (h) Goulard's Lotion, (i) Lithiæ Citras Effervescens.

6. Name the ingredients in each of the following preparations: (a) Ung. Acidi Carbolici, (b) Inj. Ergotæ Hypoderm, (c) Syr. Ferri Iodidi, (d) Liq. Epispasticus, (e) Mist. Cretæ Comp., (f) Griffith's Mixture, (g) Camphor Mixture.

PRACTICAL PHARMACY.

Examiner—CARL FREDERIC HEEBNER, Ph.G., Phm.B.

1. *Ferri et Ammonii Citras*. In sample submitted:

(a) Determine by the official process the amount of iron present.

(b) Determine the presence or absence of fixed alkali.

(c) State if you consider it a well made specimen and having the character of, and responding to the tests of the B.P.

“*Characters and Tests*.—In thin transparent scales of a deep red color, slightly sweetish and astringent in taste. It is soluble in half its weight of *water*, and al-

most insoluble in alcohol (90 p.c.). When incinerated with free access of air, it leaves 31 or 32 per cent. of ferric oxide, which is not alkaline to *litmus* (absence of fixed alkalis). Heated with *solution of potassium hydroxide* it evolves ammonia and deposits ferric hydroxide. The alkaline solution from which the iron has separated does not, when slightly supersaturated with *acetic acid*, give any crystalline precipitate (absence of tartrates). It should not yield more than the slightest characteristic reaction with the tests for sulphates." *Pharmacopœia Britannica*.

2. The sample of Arsenical Solution submitted does not conform to the official requirements. Determine its strength, using ten cubic centimeters for titration and show work. (The sp. gr. of the solution is approximately 1.00).

Liquor Arsenicalis. "25 cubic centimeters, neutralized with hydrochloric acid and diluted with water, should discharge the color of 50.8 to 50.9 cubic centimeters of *decinormal iodine solution*, the presence of a slight excess of sodium bicarbonate being maintained throughout the operation." *Pharmacopœia Britannica*.

3. Prepare the following ointment and submit it for inspection :

Unguentum Hydrargyri Nitratis.

Mercury, 2 grams;
Nitric Acid, 6 cubic centimeters;
Lard, 8 grams;
Olive Oil, 14 grams.

Dissolve the mercury in the nitric acid, without heat, agitating gently from time to time. Heat the lard and olive oil together, to a temperature of 115° C. Add the mercurial solution very gradually, stirring constantly to promote the disengagement of fumes. When frothing has ceased, the mixture must be stirred until it is cold.

(a) What are the chemical and physical changes resulting from the action of nitric acid upon the fats.

(b) Why are these changes desired.

(c) Explain effects of using heat in dissolving the mercury, and of adding the solution to the melted fat when the latter have been overheated.

PRESCRIPTIONS.

Examiner—CARL FREDERIC HEEBNER, PH.G., Phm.B.

1. Translate the following prescriptions:

(a) ℞ Liquoris morphinæ acetatis minima quadraginta; Liquoris senegæ concentrati sesdrachmam; Spiritus chloroformi minima sedecim; Aquam destillatam ad fluidunciam cum semisse. Misceantur. Signetur: Statim sumatur et repetatur inter noctem si tussis increbuerit. Sequenti aurorâ, sumat olei ricini quantum satis sit ad alvum solvendam.

(b) ℞ Hyd. chlor.	10
Tr. Hyos	24
Ext. Stigmat. maydis	32
Syr. sacch.	20
Aq. aurant. flor. ad	128

M. ft. mist.

Sig. Δ ij ex aq. omni nocte h. s. capiendæ.

2. Expand and translate:—(a) diluc., (b) qq. v^{ta} hor, (c) M.d.s., (d) b.i.d.p.c., (e) M. ft. mas. et in cht. vj div., (f) seg. p. hor., (g) ʒj + a. D. et T. et H.S., (h) p. rat. æt.

3. What should be dispensed for the following:—Hoffman's Anodyne, (b) Plummer's Pill, (c) Quevenne's Iron, (d) Mistura Alba, (e) Iodine Liniment, (f) Prunelle Salt, (g) Salt of Tartar, (h) White Vitriol, (i) Acetylsalicylic acid, (j) tri-chlor-butylidene-glycol, (k) $C_6H_4OHCOOC_6H_5$.

4. Translate the following: (a) Sæpe in amygdalis et faucibus pulverisenda. (b) Capiat capsulas duas hora nona et hora quinta dum neuralgia persistet. (c) In clavo mane et nocte pingendum. (d) In alutam extendam. (e) In aurem sinistram quaque hora dimidia, prima vel secunda instillenda.

Criticise the following prescriptions. Point out any cases of incompatibles or excessive doses if such occur, and state how you would dispense them.

5. ℞ Potass. iodidi	ʒij
Potass. bromidi	ʒiij
Sodii nitritis	ʒj
Spt. ætheris nit.	fʒj
Glycerini	fʒss
Aq. sacch.	ad fʒiij

M. ft. mist. et Sig:—Cap.coch. min. t.i.d.p.c.

6. ℞ Tinct. cinchonæ comp fʒiij
 Tinct. ferri perchlor
 Tinct. aurantii aa fʒss
 Liq. strychninæ fʒj
 Syr. simplicis fʒxij
 Aquam destillatam ad fʒvj
 M.s.a. et ft. mist
 Sig:—fʒj ex cyatho aqua anti cibum sumenda.
7. ℞ Cocainæ hydrochlor. gr.c.
 Adipis puri q.s ut ft. ʒij
 M. ft. ung. Sig:—Sæpe modo prescripto admoveatur.

PRACTICAL DISPENSING.

Examiner—CARL FREDERIC HEEBNER, Ph.G., Phm.B.

Time : Two and a half hours.

NOTE.—Candidates will dispense the following prescriptions with neatness, accuracy, and dispatch; labelling and finishing the compounds as if designed for patients. The order and cleanliness with which the candidate does his work, as well as the condition in which each dispensing desk with its utensils is left, will be rated.

Miss Lillian Everett.

- ℞ Olei terebinth rect. fʒij
 Ammonii carbonatis ʒj
 Sodii hypophosphitis gr. xxiv
 Pulveris tragacanthæ q.s.
 Syrupi q. s. ut ft fʒiij

M.s.a. ft mist. et signetur: Exhibe coch. min. hora nona mat. et hora VI^{ta} vesp. si opus sit.

Dr. E. C. Lewis,
 22 Cottage Street,

- ℞ Rhei pulveris 650
 Sodii bicarbonatis 1 300
 Olei menth. pip. 325
- M. ft. mas et div. in pil. no x
 Sig. Pil. p. c. cap.

Mrs. Grout.

Mitte Æmp. Lyttæ

in empl. adhesiv. extend. admoveatur post aurem
sinistram et post vesicationem imponatur Ceratum
Galenii.

Geo. H. Ray, Esq.,
Edgell Street.

℞	Plumbi acetatis	gr. xij
	Ext. belladonnæ vir.	gr. iij
	Olei theobrom.	q.s.

Fiant suppos. sex

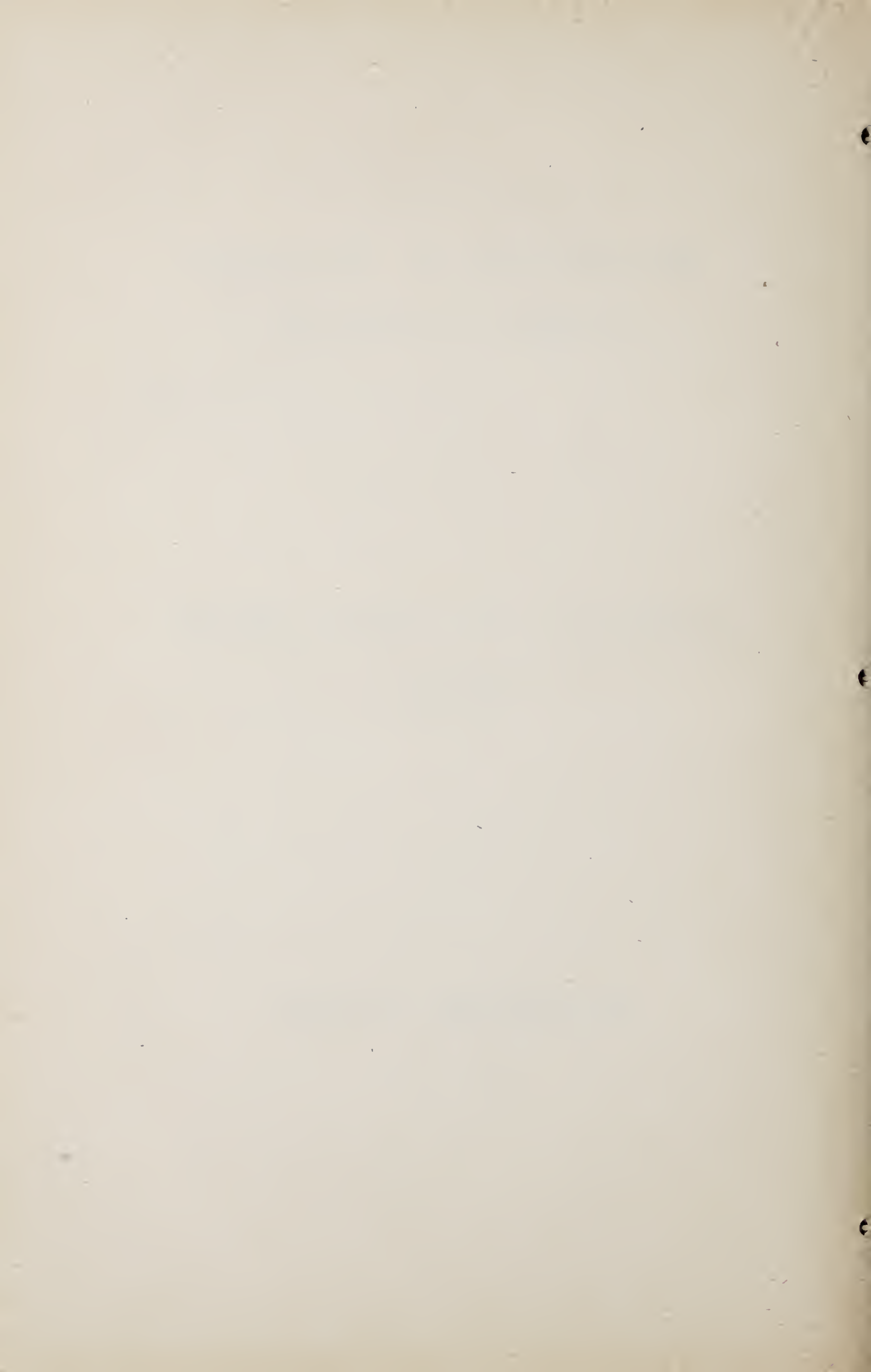
Sig. Suppositorium omni nocte utatur.

University of Toronto

DEPARTMENT OF AGRICULTURE.

ANNUAL EXAMINATIONS
1912.

FOURTH YEAR.



ENGLISH PROSE.

Examiner—J. B. REYNOLDS, M.A.

NOTE:—Six questions will constitute a full paper, of which, questions 2, 5, 6 and 7 must be chosen.

1. Discuss Carlyle's relation to his age, with reference to the social, religious and scientific theories of the day.

2. Name the authors of the following selections. Explain the connection of each passage and point out any distinguishing features:

(a) So soon as prudence has begun to grow up in the brain, like a dismal fungus, it finds its first expression in a paralysis of generous acts. The victim begins to shrink spiritually; he develops a fancy for parlours with regulated temperature, and takes his morality on the principle of tin shoes and tepid milk.

(b) Those ever springing flowers and ever flowing streams had been dyed by the deep colours of human endurance, valour, and virtue; and the crests of the sable hills that rose against the evening sky received a deeper worship, because their far shadows fell eastward over the iron wall of Joux, and the four-square keep of Granson.

(c) While it had ever ministered to the fine arts, it now proceeded to subserve the useful. It took in hand the reformation of the world's religion; it began to harmonize the legends of discordant worships, it purified the mythology by making it symbolical; it interpreted it, and gave it a moral and explained away its idolatry. It began to develop a system of ethics, it framed a code of laws; what might not be expected of it as time went on were it not for that illiberal, unintelligible, fanatical, abominable sect of . . . ?

(d) They recognized no title to superiority but his favour; and, confident of that favour, they despised all the accomplishments and all the dignities of the world. If they were unacquainted with the works of philosophers and poets, they were deeply read in the oracles of God. If their names were not found in the registers of heralds, they were recorded in the Book of Life. If their steps were not accompanied by a splendid train of menials, legions of ministering angels had charge over them.

(e) Without hands a man might have feet and could still walk; but, consider it,—without morality intellect were impossible for him; a thoroughly immoral man could not know anything at all! To know a thing, what we can call knowing, a man must first love the thing, sympathise with it. If he have not the courage to stand by the dangerous-true at every turn, how shall he know?

3. "Stevenson was the direct descendant of Scott." How? Give the main features of his work as a writer of novels.

4. Write a note on Ruskin's social and economic theories.

5. Outline the development of the novel after Scott, mentioning briefly the most representative authors and the character of their books.

6. Write a short note on each of the following authors: Ainsworth, George Eliot, Newman, Lever, Bulwer Lytton.

7. The nineteenth century was an age of controversy. Enlarge upon this, showing the broad changes which influenced men's thoughts on science, religion and sociology.

ENGLISH POETRY.

Examiner—J. B. REYNOLDS, M.A.

1. Give an account of the present situation, the past experiences, and the character, of Ulysses, as set forth in Tennyson's poem.

2. (a) Describe the form and style of each of the following poems,—indicating the kind of diction, the imagery, and the verse-form of each: Break, Break, Break, Prospice, Tears, Idle Tears, Crossing the Bar.

(b) Define clearly and simply the emotions expressed in these poems.

3. *There* methinks would be enjoyment more than in this *march of mind*.

There: Where? *March of mind*: explain.

Give the substance of the part of the poem immediately following this quotation.

vernimmt man einen unterirdischen Donner. Im Boden entstehen plötzlich Risse und Spalten, die sich ebenso schnell wieder schliessen, Menschen und Tiere, Bäume und Häuser in ihrem Abgrund verschlingend.

1. Translate the above passage.

2. Give the third singular of the following: verschieden, findenstatt, wahrgenommen, zusammenstürzen, werden,

3. "Besonders gefährlich sind die Erdbeben in Küstengegenden."

Give reasons for the above statement.

B.

Erhitzt man ein Stück Eis, so schmilzt es, und verwandelt sich in Wasser, welches bei weiterer Zufuhr von Wärme gasförmig wird und in Wassergas übergeht. Dasselbe lässt sich durch Abkühlung wieder in flüssiges und dieses durch denselben Vorgang in festes Wasser zurückführen. Wir haben durch Schmelzen und Verdampfen, durch Verdichten und Gefrieren alle möglichen Eigenschaften des Wassers Gestalt und Volumen, Farbe und Durchsichtigkeit, Festigkeit, Dichte und Aggregatzustand geändert, aber der Stoff ist unverändert geblieben. Eis, Wasser und Wassergas bestehen aus demselben Stoff, aus Wasser.

1. Translate.

2. What law does this exemplify?

3. Give the principal parts of the following verbs: wird übergeht, lässt, zurückführen, geblieben.

C.

(Sight)

Die Kartoffeln.

Die Kartoffeln wachsen auf dem Felde. Sie stehen in langen Reihen. In der Erde befinden sich die Wurzeln mit den Knollen. Die Knollen nennen wir Kartoffeln. Über die Erde ist der Stengel. An dem Stengel sehen wir Blätter und Blüten. Aus den Blüten werden grüne Kügelchen. Das sind die Früchte. Sie werden nicht gegessen. Im Herbst verdorren die Stengel und die Blätter. Dann sind die Kartoffeln reif. Nun ernten wir die Kartoffeln. Wir schütten sie in den Keller. Die Mutter kocht die Kartoffeln. Gute Kartoffeln sind eine gesunde Speise. Reiche und arme Leute essen sie gern. Auch die Haustiere füttert man mit Kartoffeln.

Wurzeln—root; ernten—gather in; Stengel—stalk; Keller—cellar.

1. Translate.

D.

Translate:

1. When are potatoes ripe?
2. They are ripe when the leaves and stalks wither.
3. Who eat potatoes? Both rich and poor people.
4. Who will cook the fruit? My mother will cook it to-morrow.
5. Domestic animals eat potatoes, if they are good.

FRENCH.

Examiner—M. A. HAMILTON, B.A.

A.

On jette les feuilles classées dans de grandes poêles en fer placées sur des fourneaux et on les remue constamment pour les empêcher de brûler. Au bout de quelques minutes elles se crispent et pétillent: on les retire, on les étend sur des tables, et des ouvriers les pressent, les roulent entre leurs mains. On répète plusieurs fois le grillage et l'enroulement, mais en chauffant de moins en moins à chaque opération. Quand les feuilles sont bien repliées sur elles-mêmes et bien séchées, le thé est prêt pour le commerce. Cependant, pour augmenter son parfum, on y mêle d'ordinaire des plantes odorantes ou d'autres substances dont les fabricants gardent soigneusement le secret.

1. Translate.
2. Give directions for making an infusion of "le thé."

B.

Placez sous un grand verre une bougie allumée. Bientôt la flamme devient moins vive, jaunit, s'effile, s'accroche au haut de la mèche et s'éteint en laissant échapper une petite couronne de fumée blanchâtre. La flamme a été étouffée, faute d'air, comme mourrait étouffé un oiseau placé sous un verre ou renfermé dans une boîte. La flamme a donc besoin d'air. C'est lui qui l'alimente.

Sans air il n'y a pas de feu. Un morceau de braise bien allumé, placé sous un verre, s'éteint comme la bougie: C'est l'union de l'air avec la matière combustible qui produit le feu avec sa chaleur et sa lumière.

1. Translate.

2. Give the 3rd sing. imperfect subjunctive, and 1st plural present subjunctive: placez, devient, laissant, mourrait.

C.

Pour reconnaître d'où vient le vent, on a inventé un petit appareil nommé "girouette."

1. Explain in your own words the construction of the "girouette."

D.

Pour extraire l'huile des olives, on les écrase sous une meule verticale dans un moulin semblable à celui où l'on écrase les pommes pour faire le cidre. Quand elles sont bien broyées, on met la pulpe dans les sacs que l'on presse pour en faire sortir l'huile. Autrefois on employait des presses à vis en bois ou en fer comme celle des pressoirs à cidre et à vin. Mais aujourd'hui on se sert de machines bien plus fortes nommées presses hydrauliques: dans ces presses la force est donnée par de l'eau comprimée au moyen d'une pompe.

1. Translate.

2. Give the 1st singular past definite of faire, met, sortir, employait, sert.

E.

(Sight)

Un matelot, à bord d'un vaisseau, ayant eu la maladresse de laisser tomber par-dessus le bord une théière d'argent, alla trouver le capitaine et lui dit, "peut-on dire d'une chose, qu'elle est perdue, lorsqu'on sait où elle est? Non, mon ami. En ce cas, vous n'avez rien à craindre pour votre théière; car je sais qu'elle est au fond de la mer.

Matelot—sailor,
maladresse—awkwardness.
théière d'argent—silver teapot,
craindre—fear.

ECONOMICS.

Examiner—H. H. LEDREW.

1. "In regard to the selling of cheese there is only one thing of real importance and that is to have an article of superior quality. All other considerations are insignificant in comparison."

The middleman is a necessary factor in the successful handling of Canadian produce.

Discuss these statements.

2. Give a full account of agricultural co-operation in the following countries:- Ireland, Denmark, France, Canada.

3. Give details of the founding and operation of the Raiffeisen system of agricultural credit.

4. It is claimed that Ontario is a co-operative desert; that the farmers of this province lack business training; that they are too independent to act jointly; that the open stretches of country are too great to afford best development in organization work; and that the very great mixture of races operate against co-operation. Assume these to be true and tell how you would organize the farmers under such difficulties.

5. What are the advantages of:-

(a) Incorporation.

(b) Limited Liability.

(c) Joint stock organization.

(d) Co-operation.

6. Is the exodus from the country to the city natural and inevitable? Prove your claim.

7. Show the relation of co-operation and such rural problems as:-Boys leaving the farm; bad roads; sanitary conditions; medical attendance; telephone communication; recreation.

PART II.

8. Give Ricardo's theory of rent and deal with its operation in this country.

9. Write comments on the Single Tax; the unearned increment; the advantages of *thrift* to a community.

10. What do you mean by:-

- (a) Profits
- (b) A living wage.
- (c) Socialism?

SOIL PHYSICS.

Examiner—W. H. DAY, B.A.

1. (a) Give full and explicit directions for the physical analysis of a soil.

(b) Show the value from an agricultural standpoint of knowing the physical composition of a soil.

2. (a) You are given five soils, viz: coarse sand, fine sand, loam, heavy clay, and muck, in any quantity required. Outline a method of determining the percent of water *by volume* that the soils are capable of delivering to plants before the latter begin to suffer.

(b) Indicate approximately in tabular form the data you would arrive at for the above soils in the course of the necessary determinations.

3. Write a *full* treatment of soil moisture, under the following heads: Importance; Loss ; Conservation.

4. The specific heat of dry sand is .1, its apparent specific gravity 1.68, its capillary capacity by volume is 26.8% Without allowing for evaporation, how many degrees Fahrenheit will 100 B.T.U. heat one cubic foot of the sand, (1) dry, (2) containing half its capillary capacity of water, (3) containing its full capillary capacity of water?

5. If the cubic foot of saturated sand referred to in No. 4 is in the form 1 foot x 1 foot x 1 foot, and if while the 100 B.T.U. were being applied, evaporation carried off water equal to .02 inches in depth over the square foot of surface, how many degrees would the 100 B.T.U. raise the temperature of the cubic foot of saturated sand?

6. Note the various natural agencies of soil ventilation, and discuss the extent to which each will produce change of air in the soil, using mathematical illustration with the processes that admit of it.

7. Trace the effect of manure on the temperature of a soil to which it is added, showing reasons for the fluctuations mentioned.

TILLAGE AND DRAINAGE.

Examiner—W. H. DAY, B.A.

1. A drain in which a number of owners are interested is required in a certain locality. What considerations will determine whether procedure should be taken under the Municipal Drainage Act or under the Ditches and Watercourses Act?

2. Outline the course of procedure under the Ditches and Watercourses Act.

3. State the limitations to which a Municipality is subject in borrowing and lending money for tile drainage purposes.

4. If two ten inch tile laid on a grade of 2 inches in 100 feet empty into a 12 inch tile what grade must the latter have to give capacity equal to that of the two tens combined?

5. A ditch 4 feet wide at the bottom, 6 feet deep, with sides sloping 1 horizontal to two vertical, has a grade of 1 inch in 100 feet. If $C = 75$, from what area will the ditch carry off 1 inch of water in 24 hours?

6. Enumerate the physical effects of drainage on the soil and shew how each effect is produced.

7. Discuss deep vs. shallow drainage.

8. A black muck swamp of about six acres lies between sandy hills. A creek about two feet deep runs along one edge of it. There is good fall towards and along the creek, and plenty of outlet where the creek leaves the flat. At or near the base of the hills there is an almost continuous "springy" strip. To prepare the flat for golf the crest of the hills composed of very fine sand is scraped down and spread over the muck to a depth of about 18 inches. Then the flat is drained with lines of tile 30 feet apart and 18 inches deep emptying into the creek.

Discuss with reasons the likelihood of this drainage proving a success or failure, and if the latter prescribe the remedy most advisable under the circumstances.

9. A heavy clay field has been badly "puddled". Prescribe, with reasons, a method of bringing it as speedily as possible into proper condition.

CLIMATOLOGY.

Examiner—W. H. DAY, B.A.

1. (a) Derive a formula for determining the noon altitude of the sun.

(b) Using the above formula find the noon altitude of the sun at Guelph on March 20th, June 21st, and September 22nd.

(c) Shew the relation of altitude of the sun, distance of the sun, absorption by the atmosphere and duration of sunshine to the total insolation received on a given meridian at the earth's surface during a day.

2. (a) Outline by aid of map the general system of oceanic circulation.

(b) Account for the system in general, and shew how and why corresponding currents north and south of the equator differ in magnitude and intensity.

(c) Shew the relation of the main ocean currents to the climate of the various districts affected by them.

3. Explain the causes of Land and Sea breezes, and of Monsoons.

4. A mountain range lies across the path of the prevailing winds. Trace the variations of humidity, precipitation, and temperature on both sides of the range, with minute explanations of the reasons for those variations.

5. Contrast the climate of Victoria, Banff, Winnipeg, Owen Sound, Toronto, Guelph, Quebec and Halifax, accounting for any peculiarly noteworthy features in reference to the climate at any of the stations.

6. (a) Derive formulæ for determining the two factors upon which division into life zones and crop zones is based.

(b) Determine the factors referred to in (a), also the length of the growing season for stations A and B.

MEAN MONTHLY TEMPERATURES.

	Station A.	Station B.
January	24.6	58.5
February	25.4	57.7
March	32.1	53.2
April	44.1	46.8
May	57.2	40.5
June	68.3	36.7
July	74.4	39.9
August	73.2	39.9
September	65.2	40.8
October	54.3	44.4
November	41.4	51.6
December	31.1	56.8

LOGARITHMS AND THERMODYNAMICS.

Examiner—W. H. DAY, B.A.

1. Define logarithm. Prove: The logarithm of a quotient is equal to the logarithm of the dividend diminished by the logarithm of the divisor.

Prove:—

$$\text{Log}_b N^p = p \log_b N$$

2. Find: $\text{Log}_5 \sqrt[5]{125}$; $\text{Log}_9 \cdot 3$; $\text{Log}_a \sqrt[4]{A^{\frac{8}{5}}}$

3. Expand a^x in the ascending powers of x.

4. Expand:— $\log_e (1 + x)$ in ascending powers of x.

5. If logarithms of all numbers to base a are known show how to find therefrom $\text{Log}_b N$.

6. A volume of air at 70° expands adiabatically to twice its original volume. Find the new temperature.

7. Make a drawing to illustrate the production in order of the operations known as Carnot's cycle, describe the operations, and give in the same drawing the indicator diagram.

8. 24.74 cubic feet of air under a pressure of 2125 pounds per square foot and at a temperature of 90° F. is caused to pass through Carnot's cycle, doubling its volume in the first operation and doubling again in the second. Find the work done by the air during the cycle.

$$\text{Log}_e 2 = .693147$$

ELECTRICITY, LIGHT AND SOUND.

Examiner—W. H. DAY, B.A.

1. Make drawings to illustrate series dynamo, shunt dynamo, and series-shunt.

2. Draw diagrams illustrating the wireless telegraphy apparatus, and explain the principle.

3. It is desired to construct a motor that will reverse by using a double-pole, double-throw switch. Shew how the wiring should be done.

4. Explain the action of the Toepler-Holtz induction machine.

5. State the laws of reflection of light and explain the formation of images by a concave mirror.

An object is placed 56 c.m. from a concave mirror whose focal length is 20 c.m. Find the position of the image. Is it real or virtual? What is its size if the object is 4.2 mm. broad and 14 mm. long?

6. Define the unit candle-power.

Describe fully any form of Bunsen grease-spot photometer, and show how you would determine the candle-power of a gas flame by it.

7. A candle is placed between a pair of hinged mirrors placed 45° apart. How many images are produced?

In a diagram show the position of the various images and trace the path of the rays by which the fourth image may be seen by an observer in front of the mirrors.

8. What is resonance and how would you apply the fact to determine the velocity of sound produced by a C-tuning fork?

9. How does the frequency of the note emitted by a wire of given material vibrating transversely depend upon (1) the length, (2) the tension, (3) the diameter of the wire.

ORGANIC CHEMISTRY.

Examiner—J. W. BAIN, B.A.Sc.

1. Give an account of the preparation and general properties of the aliphatic aldehydes.
2. Describe the methods of preparing the nitro compounds, amido acids and sulphonic acids of the aliphatic series, and compare the chemical characteristics of each group with those of the corresponding group of aromatic compounds.
3. Give an account of the chemistry of the monosaccharides.
4. How are acetoacetic ester and malonic ester prepared and for what reasons are they important?
5. Give an account of the diazo reaction and illustrate its application to the preparation of a phenol, a halogen substitution product, a hydrocarbon and a cyanide.
6. Give a method for preparing each of the following: salicylic acid, aniline, methylamine, allyl alcohol.
7. Show how the theory of stereoisomerism applies to the tartaric acids.

INORGANIC CHEMISTRY.

Examiner—J. W. BAIN, B.A.Sc.

1. Give an account of the gases of the atmosphere and of the methods employed for their separation.
2. Describe three methods for determining molar weights, pointing out the advantages and limitations of each. Sketch roughly the apparatus which you would employ.
3. Give an account of the chemistry of phosphorus.
4. Illustrate the meaning of the statement: "The chemical properties of the elements are periodic functions of their atomic weights."
5. How would you account for the fact that the heat liberated in neutralizing one litre of a normal solution of any acid by a normal solution of a base is always the same? Give what arguments you can in support of your views.
6. Discuss the chemistry of either (a) boron (b) manganese or (c) antimony.
7. State the preparation and properties of ozone. On what grounds is the symbol O_3 assigned to it? How would you determine the amount of ozone present in air after passing through an ozonizer?

QUALITATIVE ANALYSIS—WRITTEN.

Examiner—H. L. FULMER.

(Specialists in Chemistry and Physics)

1. Discuss the method of using, and the value of, the blowpipe in qualitative analysis.

2. (a) Give the four group reagents, and state the metals whose solutions are precipitated by each.

(b) Express by equations the action of the group reagent in each case, on a silver, mercury, iron, aluminium, and barium salt, and on an arsenate.

3. (a) What is the action of hydrochloric acid upon the sulphides of iron, nickel, zinc, manganese and cobalt?

(b) What is the action of barium carbonate upon cold solutions of iron, aluminium, chromium, zinc, and manganese.

4. Why is NH_4Cl solution added before precipitating the Third Group metals? In the light of the ionic theory describe in full how ammonium chloride accomplishes this function.

5. The presence of what substance or substances makes it necessary to modify the ordinary system of analysis for the third group? Briefly describe the nature of and the reasons for this modification.

6. Describe the fusing operation for effecting solution and tell when and in the presence of what common substances it is necessary to resort to it. What is the fate of the acid radicles?

7. How would you confirm the presence of Bi, As, Ni, and Mn? How would you detect ortho phosphoric acid?

8. Write chemically the following reactions, stating observations at end of reaction:

(a) Copper sulphate + ammonium hydroxide in small quantity and in excess.

(b) Silver chloride + amm. hydroxide.

(c) Arsenious sulphide + yellow amm. sulphide.

(d) Mercuric chloride soln. + stannous chloride soln.

(e) Aluminium hydroxide + potassium hydroxide soln. in excess.

QUALITATIVE CHEMISTRY.

PRACTICAL.

Examiner—H. L. FULMER.

(Specialists in Chemistry and Physics)

1. A single salt. Identify it.
2. A double salt. Identify it.
3. A mixture of substances. Identify the acids and bases present.

NOTE:- Give an outline of your work full enough to show clearly how you arrived at your conclusions.

VOLUMETRIC ANALYSIS.

Examiner—H. L. FULMER, B.S.A.

(Specialists in Chemistry and Physics)

1. Give and discuss the conditions necessary to the successful carrying out of the volumetric system of analysis.

2. Outline in detail a method for making (a) decinormal sulphuric acid and (b) $\frac{N}{5}$ iodine solution.

3. Name the divisions into which volumetric methods throw themselves and discuss the essential features of each division.

4. What indicator would you use in the determination of each of the following: ammonia, a bicarbonate, an organic acid? Give reasons.

5. You are given a mixture consisting of sodium hydroxide and sodium carbonate.

Outline in detail how you would estimate the quantity of each one present, illustrating your method by means of fictitious figures for weights and volumes.

6. (a) Give Kjeldahl's method for the determination of nitrogen in organic forms.

(b) Give the modified Kjeldahl method for estimating nitrogen in nitrate form.

(c) Write all the reactions which take place in (a) and (b).

GRAVIMETRIC ANALYSIS.

Examiner—H. L. FULMER.

(Specialists in Chemistry and Physics)

1. Discuss concisely the principles underlying gravimetric analysis.
2. Write a short note on the chemical balance under the following heads: (a) Sensitiveness. (b) Adjustment (c) Care (d) Testing the weights.
3. Outline directions for the analysis of a soil for mineral constituents according to the methods of the A. O. A. C., using 1.115 H Cl for digestion. Mention other solvents sometimes used in place of hydrochloric acid of above strength.
4. Write a short but complete article on "The Incineration of the Precipitate." Illustrate your article with examples.
5. (a) How would you determine the percentage of fat in a sample of butter? In a sample of alfalfa (green)? Criticize the methods used.
(b) Which would you prefer as a solvent in fat determinations, ethyl ether or petroleum ether? Give reasons.
6. State the essential features in the method for the determination of iron. Write reactions.

CHEMISTRY OF INSECTICIDES AND FUNGICIDES.

Examiner—H. L. FULMER.

(Specialists in Agriculture, Horticulture, Biology, and Chemistry and Physics)

NOTE—Specialists in Agriculture omit question 5; those in Chemistry and Physics, Biology, and Horticulture omit question 6.

1. Give a short but complete history of the use and development of *sulphur* and *lime-sulphur* as spray materials from the earliest time up to the present day.
2. Give an account of the acids of Arsenic.

3. Write an article on arsenate of lead using the following heads:

(a) Kinds, and approximate arsenic (As_2O_5) content of each.

(b) Applicability of each in the various spraying operations, with reasons.

(c) Desirability and method of making on the farm.

4. From what you have read or experienced, or both, give an account of the probable effect which the continued application of arsenicals year after year, upon an orchard, will have upon trees and soil.

5. Give full directions for the manufacture, storage, and use of home-made concentrated lime-sulphur.

6. Give in detail, and compare as to efficiency and effectiveness quoting figures for the same, the different methods for treating seed grain for smut.

7. Outline complete directions for making calcium arsenite and, in point of essential modern features of an arsenical poison, compare it with lead arsenate and Paris green.

8. If $\frac{1}{4}$ oz. of K C N, 98% pure, is used for fumigating 1000 cu. ft. of space, what percentage by volume of the atmosphere will be made up of hydrocyanic acid gas?

1 litre = 61.027 cu. in.

1 lb. = 453.6 grams.

ANIMAL CHEMISTRY.

Examiner—R. HARCOURT, B.S.A.

(Specialists in Agriculture, Dairying, Chemistry and Physics, and Bacteriology.)

1. Compare the food of plants and animals, and also the duties it has to perform.

2. Kellner has determined the true heat value of certain foods to the ox, and also their production values.

(a) Explain how this may be done.

(b) Give the proposed formulae for calculating maintenance and production values of feeds for ruminant animals, and explain how these may be formulated.

(c) Of what value are these to the feeder?

3. (a) What circumstances influence the digestibility of a feed?

(b) To what extent may the digestibility of a feed be altered by its combination with other feeds?

4. Explain why the return in increase for food consumed gets steadily less as the animal matures.

5. What reasons can be given in support of the statement that the hog is the most economical meat-making machine at the farmer's disposal?

6. Outline a method for the analysis of a fodder, and show wherein the method is weak.

7. Explain why there has been less difficulty in studying out the laws of flesh formation than those relating to formation of fat.

8. Explain clearly the underlying principles of feeding standards, and show their value.

AGRICULTURAL CHEMISTRY.

Examiner—R. HARCOURT, B.S.A.

(Specialists in Agriculture, Dairying, Horticulture, and Physics and Chemistry.)

1. Explain as fully as possible the changes that take place in a seed during germination.

2. Show how plant food in the soil, nitrogen, phosphoric acid, potash and lime in particular, is rendered available, and also, why is it not readily lost in the drainage water?

3. (a) Explain why an excessive loss of nitrogen may follow the plowing down of an old sod or the plowing in of farmyard manure.

(b) How can you explain the fact that sterilizing a soil may increase its productiveness?

4. (a) Give an account of the value of lime in a soil.

(b) Under what conditions would you consider carbonate of lime of more value than fresh burnt lime?

5. Outline a method for the determination of humus, and state fully its value in the soil.

6. From a chemical standpoint, show the beneficial effects of drainage.

7. Give an account of the principal phosphatic fertilizers, and show under what conditions one may be preferred to another.

8. Discuss the principles underlying the manuring of (a) an apple orchard and (b) mangels, and state the difference this will make in the nature of the materials used.

9. (a) Show as clearly as possible why the use of fertilizers is surrounded by so many difficulties.

(b) Explain fully what you would suggest as a good method for a farmer to follow in making himself familiar with the subject.

DAIRY CHEMISTRY.

Examiner—R. HARCOURT, B.S.A.

(Specialists in Dairying.)

1. Show clearly why milk is so valuable as a food.
2. Give an account of the mineral salts in milk and show their importance.
3. (a) Show wherein milk fats differ from (i) animal fats and (ii) vegetable oils.
(b) Give the chemistry involved in the determination of the volatile acids in butter.
(c) What circumstances render it difficult to accurately determine if butter is adulterated with animal fats?
4. What are the chief changes that take place in butter when it becomes rancid?
5. Show the importance of lactose in milk.
6. Give an account of the chemistry involved in the manufacture of good, well cured Cheddar cheese.
7. Show why a knowledge of the casein content of milk will be of value in cheese making, and explain the methods advanced for its determination.
8. (a) Discuss the losses of milk that occur in the city trade and of milk constituents in the manufacture of milk products.
(b) Give an account of the efforts being made, both in the city trade and in the manufactured products, to save for human consumption more of the valuable constituents in milk.

DAIRY CHEMISTRY.

Examiner—R. HARCOURT.

Specialists in Dairying (Practical).

1. In what way have samples of milk marked 1, 2, and 3 been treated to preserve them?
2. What colouring matters have been used in samples of milk marked 1, 2, and 3.
3. Which of the two samples of butter submitted have been renovated? Give full account of all work done.

CHEMISTRY OF FERMENTATIONS, FRUITS AND VEGETABLES.

Examiner—R. HARCOURT, B.S.A.

1. Give one good classification of the protein bodies and explain the basis of this classification.
2. Show the difference in the nature and composition of animal fats and vegetable oils and explain why some of these "dry" more readily than others.
3. Under what conditions has it been shown that certain ferments may cause synthetic changes?
4. Give an account of the chemistry of malting and brewing and explain the function of tannin in the preparation of alcoholic liquors.
5. Explain the difference in the nature of the changes that take place in potatoes kept at a little above freezing as compared with a higher temperature.
6. Describe the general process of canning and state why there is more difficulty in canning corn and beans than tomatoes.
7. Show the chief characteristic reactions brought about by fermentation.
8. Give an account of the chemistry of the ripening of fruit and the changes that take place in storage.

9. (a) Discuss the process of vinegar making, drawing particular attention to the materials that may be used, the method, the concentration of the alcoholic solution and the losses that may occur.

(b) Suppose a man has on hand 100 gallons of cider containing 10 per cent. of sugar, calculate the theoretical yield of vinegar containing 4 per cent. of acetic acid.

PLANT PATHOLOGY.

(BIOLOGY, BACTERIOLOGY AND HORTICULTURE OPTIONS)

Examiner—J. W. EASTHAM, B.Sc., F.R.M.S.

1. Define the terms *obligate* and *facultative* as applied to parasites and saprophytes respectively. Give examples.

2. Discuss the problems presented by so-called "soil diseases". Give examples.

3. Further investigation of the fungus causing *apple scab* and formerly known as *Fusicladium dendriticum* has resulted in the extension of our knowledge of its life-history. How has this affected the name and systematic position of the organism? Has it made any difference in the measures recommended for the control of the disease? Discuss the control measures usually recommended.

4. Write an essay on Disease Resistance in plants.

5. Give the life-history of *Phytophthora infestans*. How does it differ from that of allied fungi?

6. What evidence is necessary to demonstrate the pathogenicity of an organism? Mention some contagious plant diseases for which as yet no causal organism has been found. How do you explain such diseases?

7. What are the chief diseases affecting the bean crop? How would you control them?

CRYPTOGAMIC BOTANY.
BIOLOGY AND BACTERIOLOGY OPTIONS.

Examiner—J. W. EASTHAM, B.Sc., F.R.M.S.

1. Discuss the systematic position of the Myxomycetes (Mycetozoa). Would you include *Plasmodiophora* in this group? Give reasons for your answer.
2. (a) To what comparative extent are the different groups of algae represented by fresh-water forms? Name some common algae which are terrestrial.
(b) Give some account of the types of sexual reproduction found in the Chlorophyceae.
3. Give the general character of the Basidiomycetes. Enumerate and briefly characterise the orders included in this group.
4. Discuss the nature and origin of the Ascus.
5. In what families of fungi are entomogenous species chiefly found? Mention the chief genera. Give the life-history of any one species.
6. (a) Enumerate the families of leptosporangiate Filicales. Which of these are represented in temperate North America?
(b) What is the special interest of *Isoëtes* from the evolutionary standpoint?

PLANT ANATOMY AND HISTOLOGY.
BIOLOGY OPTION.

Examiner—J. W. EASTHAM, B.Sc., F.R.M.S.

1. Describe the structure of the growing points of a Dicotyledon and contrast them with those of a fern.
2. Write an account of the structure, distribution and functions of cambium in the plant.
3. Write notes on:
 - (a) the occurrence of ciliated gametes in spermatophytes.
 - (b) companion cells.
 - (c) scalariform tracheids.
 - (d) velamen.

4. Outline the development of the ovule and its contained structures up to the time of fertilisation in *Pinus* or some similar Gymnosperm.

5. Trace briefly the evolution of the sporophyte generation and discuss the question of Homologous or Antithetic Alternation of Generations.

6. What is *Bordeaux Injury*? Discuss the relative merits of Bordeaux Mixture and Lime-Sulphur solution as summer sprays.

SYSTEMATIC BOTANY.

SPECIALISTS IN BIOLOGY AND HORTICULTURE.

Examiner—J. E. HOWITT, M.S.AGR.

1. Explain the object of the system of classification used in Gray's new Manual of Botany. Define; Archichlamydeae and Metachlamydeae.

2. State the characteristics of the Pinaceae and outline a key for the identification of the more important genera and species.

3. Name and distinguish the Orders into which the Monocotyledoneae are divided and locate in their proper families and genera a number of representative species.

4. Give the floral formula for a member of each of the following families: Iridaceae, Commelinaceae, Solanaceae, Papaveraceae, Polemoniaceae and Caprifoliaceae.

5. Describe the various agencies active in the pollination of flowers and with examples show the adaptations in the structure of flowers to these agencies.

6. (a) For Biologists—Explain by means of a diagrammatic drawing the structure of a grass spikelet and characterize the following genera of grasses; *Digitaria*, *Poa*, *Setaria*, *Alopecurus* and *Leersia*.

(b) For Horticulturists: Give the characteristics of the subfamilies of the Rosaceae and list the more important fruits and flowers belonging to each.

PHYSIOLOGICAL BOTANY.

Examiner—J. E. HOWITT, M.S.AGR.

Specialists in Biology.

1. Explain the digestion, translocation and storage of the food substances in green plants.
2. Describe the various plastids found in plants and state the function of each kind.
3. Explain osmosis and point out its importance in plant nutrition.
4. Discuss the various theories as to the cause of the transpiration current.
5. "Paratonic movements are of the highest importance for the well being of the plants concerned." Explain this statement.
6. Define: (a) plasmolysis (b) polymerization (c) primordial utricle (d) diffusible substances (e) semi-permeable membrane, (f) fluorescence (g) anaerobic respiration.

GRASSES AND PLANT PATHOLOGY.

Examiner—J. E. HOWITT, M.S.AGR.

Agricultural Specialists.

1. Describe the structure of a grass spikelet by means of a diagrammatic drawing. Distinguish between the Panicaceae and Poaceae and give the chief tribes and genera of each.
2. Characterize and state the economic importance of the following genera of grasses, *Avena*, *Phleum*, *Agropyron*, *Triticum*, *Panicum* and *Arrhenatherum*.
3. State the characteristics of the Ustilaginales and distinguish between the Ustilaginaceae and the Tilletiaceae.
4. Write a short scientific article on The Rusts of Cereal Crops.

5. Give the chief prohibitory clauses of the Seed Control Act 1911. Point out what you consider the strong and the weak features of this act.

6. Give the life-histories of the following fungi: *Ustilago nuda*, *Phytophthora infestans* and *Sclerotinia fructigena*.

7. Give directions for the control of: Apple Scab (*Venturia pomi*), Peach Leaf Curl (*Exoascus deformans*), Potato Scab (*Oospora scabies*), Stinking Smut of Wheat (*Tilletia foetens*).

VERTEBRATE HISTOLOGY.

BIOLOGICAL AND BACTERIOLOGICAL OPTIONS.

Examiners { C. J. S. BETHUNE, M.A., D.C.L.
 { T. D. JARVIS, B.S.A.

1. Describe the process of obtaining haemin crystals. Describe their color, shape and size.

2. Name the coats of an artery. Of what are these coats composed?

3. What peculiarities distinguish the muscular fibres of the heart in man?

4. State where ciliated epithelium is found.

5. Draw and describe:- (a) Lobe of lung of man; (b) Lobe of liver of pig.

6. Draw and name the parts of:- (a) Tongue of cat; (b) Skin of man; (c) Villus of intestine of man.

7. Draw and describe fully the structure of the spinal cord.

8. Write brief notes on:- (a) Tactile hairs; (b) Haversian canals; (c) White blood corpuscles of man; (d) Marrow cells.

INSECT HISTOLOGY, MORPHOLOGY,
AND PHYSIOLOGY.

(BIOLOGICAL OPTION.)

Examiners— { C. J. S. BETHUNE, M.A., D.C.L.
T. D. JARVIS, B.S.A.

1. Define Tropism, Instinct and Intelligence.

2. Define rheotropism and anemotropism. Give examples of each.

3. A maggot orients its body with reference to a source of food and then moves toward the food just as mechanically as a moth flies to a flame. Explain this phenomenon.

4. Discuss:

(a) Means of dispersal of insects;

(b) Barriers;

(c) Paths of diffusion in North America.

5. Write a paper on any one of the following subjects:

(a) Insects in relation to flowers;

(b) Insects in relation to plants;

(c) Insects in relation to other animals.

6. Write brief notes on:—

(a) Insect Drift;

(b) Adaptations of Aquatic Insects;

(c) Parthenogenesis.

7. (a) State the sources of color in insects.

(b) Discuss structural and pigmental colors in insects.

(c) Effects of food on color.

(d) Albinism and Melanism.

8. Draw and describe:

(a) Body wall.

(b) Silk glands.

(c) Stridulating organs.

ECONOMIC ZOOLOGY.

(BIOLOGICAL OPTION.)

Examiners { C. J. S. BETHUNE, M.A., D.C.L.
 { T. D. JARVIS, B.S.A.

1. Discuss the habitat, food, breeding habits, distribution, economic importance (with reasons therefor) of the following: Beaver, Ruffed Grouse, Garter Snake, Common Toad, Sturgeon.

2. Discuss the status of birds in any locality. Give examples.

3. Write brief notes on:

- (a) Migration among birds;
- (b) Migration among fishes;
- (c) Parental care among fishes;
- (d) Commensalism among animals ;
- (e) Symbiosis among animals;
- (f) Mimicry among animals.
- (g) Metamorphosis;
- (h) Moulting.

4. Name and discuss fur bearing animals of Ontario.

5. What is the history of the English Sparrow in this country? What are its habits? How do you account for its spread?

6. Discuss the habits of the rattle snake. Whence the structure giving rise to its name? The nature of the fang and the poison gland.

7. Discuss the habitat, food, culture and enemies of the oyster.

8. Write brief notes on:-

- (a) Mud Puppy;
- (b) Tree Frogs;
- (c) Gila Monster;
- (d) Painted Turtle.

VERTEBRATE HISTOLOGY.

(BIOLOGICAL AND BACTERIOLOGICAL OPTIONS)

Examiners { C. J. S. BETHUNE, M.A., D.C.L.
 { T. D. JARVIS, B.S.A.

1. Show by diagram the anatomy of the heart and the principal vessels in the circulation of the frog. Indicate by arrow the general course of the circulation, noting changes in the character of the blood in various capillary regions. Where is the purest blood in the body? Give reasons for your answer. What do you mean by "im-pure" blood? Where are the chief impurities removed from the circulation? What is the extent of the hepatic portal? What is the extent of the venal portal? What tends to insure that the purest blood in the heart shall go to the head? That the least pure go to the lungs? How much communication is there between the two sides of the heart?

2. Name the muscles of the chest, throat, and belly of the frog.

3. Draw a dorsal view of the brain of the frog showing the following parts: (a) Pineal body, (b) Olfactory lobe, (c) Optic lobe, (d) Medulla oblongata, (e) Cerebellum, (f) Cerebral hemispheres, (g) Fourth ventricle (h) Thalamencephalon.

4. Draw and describe the following parts found in the frog:- (a) Adrenals, (b) Vocal sacs (c) Pigment cells, (d) Cloaca, (e) Ear.

5. Describe the organs of respiration in:- (a) Frog, (b) Pigeon, (c) Reptile.

6. Describe the diaphragm under the following heads: (a) Its attachment, (b) The openings in the diaphragm with the structures passing through them, (c) What structures, thoracic and abdominal, lie in relation to the diaphragm?

7. Draw and describe the structure of a feather.

ANIMAL PHYSIOLOGY.

(BIOLOGICAL OPTION.)

Examiners— $\left\{ \begin{array}{l} \text{C. J. S. BETHUNE, M.A., D.C.L.} \\ \text{T. D. JARVIS, B.S.A.} \end{array} \right.$

1. The Amoeba does in a simple yet satisfactory way everything that any animal needs to do in order to live and perpetuate its species. Explain.

2. The toad under an arc light, finding food in abundance, eats until its stomach, throat and mouth are filled and attempts to catch more. Explain this phenomenon.

3. There is often more food ingested, digested and absorbed than the tissues can assimilate. What is the fate of this surplus nutriment?

4. How are toxins formed in the body and what effect have they upon the living cells?

5. Discuss the question why coagulation does not take place in the normal blood vessels.

6. Describe the mechanical phenomena of respiration. Define tidal air, complementary air, residual air, supplemental air and vital capacity.

7. State in detail the functions of (a) the saliva, (b) the succus entericus.

8. Through what channels and by what processes are the end products of digestion conveyed to the blood?

9. Describe fully the fate of haemoglobin set free in the blood.

10. (a) Write notes on the physiology of sleep.

(b) The condition of dendrons in the first stages of alcoholic insanity.

ECONOMIC ENTOMOLOGY.

(BIOLOGICAL AND HORTICULTURAL OPTIONS.)

Examiners— $\left\{ \begin{array}{l} \text{C. J. S. BETHUNE, M.A., D.C.L.} \\ \text{T. D. JARVIS, B.S.A.} \end{array} \right.$

1. What do you understand by economic entomology and how is it to be distinguished from systematic entomology?

2. An outbreak of San Jose Scale has been discovered in a new district: what precautions should be taken to prevent the spread of the insect?

3. Construct a simple key for the insects found on the Raspberry and Blackberry.

4. Give the signs and symptoms of the work of (1) The Cabbage Maggot, (2) Cherry Fruit Fly, (3) Blister Mites, (4) Cutworms.

5. Name the insects attacking the fruit of the apple and state the nature of the injury they respectively inflict.

6. Describe the injuries that may be caused to foliage bark and fruit by improper spraying.

7. What equipment is necessary for preparing the lime-sulphur wash?

8. Name some of the insects that assist in the dissemination of the spores of Pear Blight.

9. Write a paper on nursery inspection in Ontario.

INVERTEBRATE ZOOLOGY.

Examiner—E. M. WALKER, B.A., M.B.

1. Describe the methods of feeding and locomotion in the Protozoa.

2. Describe the defensive structures in *Paramœcium*, *Hydra*, *Asterias* and *Cambarus* (*Astacus*).

3. Illustrate the effects of parasitism on structure and life-history by reference to the *Platyhelminthes*.

4. Compare the general plan of organization in the *Annulata* and *Arthropoda*, illustrating by diagrams.

5. Describe the respiratory organs of the clam and the course followed by the current of water in respiration. How is this current produced and what other purposes does it serve?

6. Define the terms *contractile vacuole*, *zygote*, *prosopyle*, *parapodium*, *telson*, *pallial line*.

SYSTEMATIC ENTOMOLOGY.

Examiner—E. M. WALKER, B.A., M.B.

1. Describe the form and arrangement of the mouth-parts in the various orders of suctorial insects.
2. How would you distinguish between the larvae or nymphs of typical members of the orders Ephemera, Odonata, Plecoptera, Neuroptera and Trichoptera?
3. Discuss briefly any peculiarities in the life-history of a typical species of each of the following families: Chrysopidae, Myrmelionidae, Cicadidae, Coccidae, Cynipidae, Hippoboscidae.
4. Describe the characteristic form of the antennae and tarsi in the following families: Dytiscidae, Silphidae, Coccinellidae, Scarabaeidae, Meloidae.
5. Construct a brief key for the separation of any five families of Hymenoptera Terebrantia.
6. Define the following terms: prolegs, pulvillus, cercus, corium, halteres, propodeum.

AGRICULTURAL BACTERIOLOGY. PART I.

BACTERIOLOGY OF THE SOIL AND PLANT DISEASES.

Examiner—C. E. MARSHALL.

1. Consider soil as a culture for microorganisms and give factors influencing their growth.
2. How can microorganisms facilitate mineral solutions in the soil?
3. State comprehensively what is meant by ammonification, nitrification, denitrification, nitrogen fixation (both symbiotic and non-symbiotic).
4. What relation has the addition of lime to soil to microbial development?
5. Describe fully the bacterial disease, known as "crown gall."
6. Discuss the soft rot of carrots and other vegetables due to bacterial activity. Also state how the microorganisms break down the vegetable tissues.

AGRICULTURAL BACTERIOLOGY.

PART II.

BACTERIOLOGY AS RELATED TO WATER, SEWAGE DISPOSAL,
AND FOOD STUFFS.

Examiner—C. E. MARSHALL.

1. What important pathogenic organisms are conveyed by water?
2. What classes of microorganisms are to be regarded as indicative of danger? Why?
3. What interpretation is to be placed upon water analysis?
4. What is the significance of soil as a water filter?
5. How can sewage be best cared for in the country? Describe two methods,—one where a water system is available, and one without.
6. Describe vinegar production: (a) The organisms involved; (b) The conditions controlling; (c) The changes occurring.
7. How is food-poisoning produced by microorganisms and how may this poisoning be averted?

DAIRY BACTERIOLOGY.

Examiner—C. E. MARSHALL.

1. Discuss the influence of aëration, cooking and straining upon the germ content of milk.
2. What stable control is essential to the production of clean milk?
3. How are milk-odors or off-flavors to be traced to microbial or food origin?
4. How may microorganisms influence butter and cheese-making and what is the best method of control?
5. What is the relation of microorganisms to Cheddar cheese ripening?
6. Describe the possible action of lactic fermentation upon the "digestive processes" of the human and the likelihood of controlling off-fermentations in the alimentary tract by means of artificially-prepared fermented milk drinks.
7. Weigh carefully the evidence in favor of and against pasteurization of milk for city consumption.

BACTERIOLOGY.

(AGRICULTURE AND DAIRY OPTION)

Examiner—S. F. EDWARDS.

1. Explain ammonification, nitrification, denitrification, as occurring in arable soils. State what each process is, the chemical changes which occur in each process, and the types of microorganisms concerned in each process.

2. Show how cellulose as applied in the form of barnyard manure is converted by microorganisms in the soil into a form in which it is available for ordinary farm crops.

3. State the different types of soil organisms which are active in the fixation of atmospheric nitrogen.

4. How are the water-insoluble rock phosphates in the soil converted into a form in which they are directly available for farm crops?

5. Explain how milk may become the vehicle of infection with typhoid fever.

6. Formulate a set of rules which could be followed by the average farmer by which he would be able to produce milk of a quality equal to that of certified milk.

7. Describe fully two bacterial fermentations of milk, giving the chemical changes involved in each.

8. Explain the nature of the tuberculin test, how it is applied and the interpretation of the results.

9. Explain the production of antitoxin in the animal body.

10. Explain the so-called precipitin test for blood and its value in establishing the identity of species.

11. Describe the manufacture and use of the Dorset-Niles serum for hog-cholera.

12. Causal Organism.

Mode or Modes of Infection.

Dissemination in the Plant.

Dissemination from Plant to Plant.

Control.

Under these five headings discuss (a) bacterial blight of pear and apple, (b) bacterial blight of alfalfa.

BACTERIOLOGY.
(HORTICULTURE OPTION.)

Examiner—D. H. JONES, B.S.A.

1. Write on the nitrogen-fixation bacteria – Azotobacter and Ps. radicicola – under the following heads: Occurrence; Methods of isolation; Cultural development; Morphology; Economic significance.

2. Describe the bacterial activities incident to the manure pile when kept under the following conditions: Loosely packed; Lightly packed; Dry; Wet.

3. Write on the sub-joined plant diseases under the following heads: (a) Specific Cause; (b) Appearance in plant tissue; (c) Means of infection; (d) Control.

- (1) Oat Blight.
- (2) Pear Blight.
- (3) Black Rot of Cabbage.
- (4) Soft Rot of Vegetables.

4. Describe your experiment on the bacterial analysis of soils, giving methods of procedure and the results obtained.

5. Show in detail how vinegar may be obtained from apples, and describe the microorganisms active in the process.

BACTERIOLOGY.
(BIOLOGY OPTION.)

Examiner—D. H. JONES, B.S.A.

1. (a) Classify according to their morphology the Bacteriaceae.

(b) State the limitations of the above classification and what further steps are necessary for the identification of bacterial species.

2. (a) Give the general morphological and cultural characteristics of the Azotobacter.

(b) Name and describe three species of Azotobacter.

3. (a) Describe the parts of a bacterial cell.
- (b) Describe the various methods of bacterial spore formation.
- (c) Describe the various methods of bacterial spore germination.
4. Describe your experiment on the bacterial analysis of soils, giving methods of procedure and results.
5. Explain immunity –
 - natural*
 - racial*
 - acquired* –
 - active*
 - and the various methods of acquiring it.
 - passive.*

BACTERIOLOGY.

(DAIRY OPTION.)

Examiner—D. H. JONES, B.S.A.

1. (a) Name and describe, *i.e.* give the life history of, five moulds of economic significance in the dairy industry.
- (b) State how they affect the industry.
- (c) Describe a method whereby the full life history of any one of them may be ascertained.
2. (a) Name and describe, morphologically and physiologically, four yeasts.
- (b) State their relation to the dairy industry.
3. Describe the experiments outlined in your course for demonstrating the ways in which bacterial contaminations of milk occur. State the results of your experiments.
4. Outline your experiments showing the relationship of temperature to the microorganisms common in milk. State the results which you obtained.
5. State in detail what relations exist between milk and any five milk-borne diseases.
6. Give the procedure for making a bacterial analysis of a sample of butter.

BACTERIOLOGY.
(BACTERIOLOGY OPTION.)

Examiner—D. H. JONES, B.S.A.

Hygiene Bacteriology: Infectious Diseases of Animals.

1. Explain Ehrlich's "Side Chain Theory" of Immunity.
2. State how you would differentiate between *B. typhosus* and *B. coli*.
3. If a suspected case of diphtheria were brought to you for diagnosis, state in detail how would you proceed, and, should the finding be positive, what would you expect to see and what action would you advise?
4. State the apparently conflicting theories held regarding the disease called Hog Cholera.
5. (a) With respect to tuberculosis, point out what differences exist between the human, bovine, and avian forms, and show in what way they are related.
(b) What remedial and control measures would you advise for each of the three forms?

BACTERIOLOGY.
(BACTERIOLOGY OPTION.)

Examiner—D. H. JONES, B.S.A.

Fermentation Bacteriology.

1. (a) Name and describe the different fermentations induced by microorganisms.
(b) State in what ways these various fermentations are alike.
2. (a) Give the morphology, structure, chemical constituents, methods of reproduction of a typical Saccharomycete.
(b) Point out the differences in morphology and physiological activity in culture media of *Sacch. cereviseae*, *Sacch. fragilis*, *Sacch. membranifaciens*, *Sacch. ellipsoidens*.
3. Discuss the various theories that have been held regarding the nature of fermentation.
4. Name and state the action of eight enzymes.

BACTERIOLOGY.

(BACTERIOLOGY OPTION)

Examiner—D. H. JONES, B.S.A.

Microscopical Methods, Classification, and Technique

1. (a) Define and give examples of each of the following: General stain, special stain, basic dye, acid dye, progressive staining, regressive staining.

(b) Give the preparation and the particular uses of five of the most important stains used in bacterial examination.

2. State procedure and materials for ascertaining in bacterial cultures:-

(a) Reduction of nitrates with formation of nitrites.

(b) Reduction of nitrates with formation of ammonia.

(c) Nitrates unchanged or free nitrogen liberated.

(d) Production of indol.

(e) Acetic acid.

(f) Carbon dioxide.

3. Classify the Schizomycetes according to their morphology, and show diagrammatically how they are related to the various Hyphomycetes which you have studied.

4. Give the standard method of water analysis of the American Society of Bacteriologists.

5. Describe the common methods of sterilization by heat, chemicals, and gases.

FLORICULTURE.

Examiner—H. L. HULT.

1. Name the principal commercial florist's crops, in the order of their importance.

2. Name a few important varieties of each crop as enumerated above.

3. Name six of the most important pot plants used for house decoration.

4. Name six of the most important bedding plants.

5. Outline very briefly the culture of the violet under glass.
6. Outline briefly the culture of the sweet pea in the open.
7. Explain the propagation of begonias, chrysanthemums, coleus and cannas.
8. Write a short sketch of the forcing of Dutch bulbs.
9. Give a sketch of the propagation, culture and uses of the geranium (pelargonium).
10. What are the principal insect and fungous troubles in greenhouses? And how are they to be overcome?

LANDSCAPE GARDENING.

Examiner—F. A. WAUGH, M.A.

1. Give a definition of landscape gardening, and tell why it is a fine art.
2. (a) Name the leading styles of landscape gardening.
(b) Give a brief history of each.
(c) What are the chief characteristics of each?
3. How is unity secured in practical works of landscape gardening?
4. How is variety secured?
5. Formulate three rules covering the most important points to be observed in the design of park roads.
6. From the purely artistic standpoint, discuss the selection and planting of street trees.
7. What are the principal uses of shrubs in landscape design?
8. Name ten of the best hardy shrubs for ornamental planting.
9. To what extent and in what ways should florists' (tender) bedding stock be used in ornamental planting?
10. Draw a sketch plan of a rural school ground of one acre showing convenient and attractive arrangement of all necessary features.

POMOLOGY.

Examiner—W. S. BLAIR

1. State methods employed in propagating and growing appletrees, and grading same for sale.
2. How would you prune the apple and peach the first three years after purchased for planting? Give reasons.
3. Having purchased 20 acres of Peach land at \$200.00 per acre give detailed cost of developing same per acre to 5 years planted with peaches. What would be considered an average annual yield per acre for the next 5 years, and the annual cost of care, management and marketing. Allow \$1.75 per day for labour required and assume that a team and necessary machinery with teamster could be obtained at \$5.00 per day as required. The investment or interest on the investment is not to be considered after the 5th year.
4. Is the cover crop system of orchard cultivation desirable? and if so, why? Outline the system.
5. Have a neglected apple orchard about 30 years old, soil not fertile, trees apparently healthy but stunted in appearance planted 20 by 20 feet apart; outline a comprehensive system of renovation and probable cost.
6. In developing a standard for judging packages and packing of apples in boxes and barrels what terms would you use and explain same?
7. Having developed a number of apple seedlings to fruiting state what a complete description of them would embrace?
8. Explain the following terms used in systematic pomology. Name the fruits with which they are used and give most common descriptive terms used with each:- Compactness, Basin, Stone, Suture, Shoulder, Calyx, Tube, Carpels, Apex, Core.

PLANT BREEDING.

Examiner—W. S. BLAIR.

1. Show why a knowledge of Systematic Botany is essential to the success of the plant breeder.

2. State clearly how you would proceed to cross two varieties of apples.

3. (a) We may have hybrid plants but never hybrid germ cells. Discuss.

(b) Of what practical use to the plant breeder is Mendel's law?

4. What has been done toward developing varieties of Deciduous and Citrus fruits suitable for sections where present commercial varieties are not hardy?

5. Having secured a variety of vegetables with qualities desired, how would you maintain this standard in future crops?

VEGETABLE GARDENING.

Examiner—W. S. BLAIR.

1. Give with reasons the most suitable soil for the following vegetables: parsnips, beans, cauliflower, sweet potatoes, onions, muskmelons and asparagus.

2. Discuss in a comprehensive manner the methods of planting, blanching and storing celery.

3. State methods to follow in growing a crop of tomatoes for the early market.

4. When and how would you start plants of cucumbers, cabbage and onions for transplanting to the open ground for early crops?

5. State how you would handle rhubarb for winter forcing.

6. State principal requirements for successful cucumber growing under glass for winter crops.

7. Discuss the selection, care, planting, and management of onions for seed purposes.

8. State how you would control the late blight of celery.

AGRONOMY.

Examiner—C. A. ZAVITZ, B.S.A.

(Specialists in Dairying)

1. How would you start a permanent pasture in Ontario? Name the varieties you would use and the amount of each per acre.
2. Mention four of the principal green-fodder crops grown in Ontario. What are the advantages of each?
3. Discuss the value of the following crops for feeding to dairy cows; sugar beets, turnips, sorghum, rape, parsnips, alfalfa hay, timothy hay and corn silage.
4. Give the best information you can on Canadian variegated alfalfa, Grimm alfalfa, and common alfalfa.
5. Tell how you would sow, thin, cultivate and harvest a field of mangels.
6. Discuss selection and hybridization in their relation to the improvement of farm crops.
7. Identify the different kinds of seeds before you.
8. Tell how you would crop a dairy farm of one hundred acres in order to secure the best results.

PRACTICAL AGRONOMY.

Examiner—C. A. ZAVITZ, B.S.A.

(Specialists in Agriculture and in Chemistry and Physics.)

1. Give your opinion of the vitality of each of the varieties of seed in package number one.
2. Construct a score card for judging seed corn. Judge the samples of corn in package number two according to the score card.
3. Number and name the varieties of seeds in package number three, and briefly state the value and the use of each as a farm crop in Ontario.

4. Award prizes to the samples of oats in package number four. State your reasons for the order of the awards.

5. Identify the plants before you and make drawings of the seeds represented by the plants on exhibition.

6. Give the common and the scientific names of the different types of wheat under observation.

AGRONOMY.

Examiner—NELSON MONTEITH, B.S.A.

1. What cultural conditions are most desirable in the growing of cereals?

2. State comparative value of different clovers as fodder crops.

3. What mixture of grasses and clovers would you recommend for permanent pasture on (a) Low lying damp mucky soil, (b) Dry sandy upland soil?

4. Compare corn, alfalfa, and mangels as fodder crops, and state most improved methods of curing and storing.

5. What four-year crop-rotation would you recommend for the eradication of foul weeds?

6. Discuss the use of the land roller in ordinary field practice.

7. What treatment for smut in wheat and oats is recommended? Give formula.

8. Give short outline of the work of the Canadian Conservation Commission in its relation to agriculture.

9. Is the trend of Ontario agriculture toward more extensive or more intensive methods of farming? Explain with reasons not to exceed two hundred words.

HORSES.

Examiner—H. BARTON, B.S.A.

1. Write an account of the history and development of the most popular breed of horses in Canada. Briefly compare this breed in utility and characteristics with the other well-known breeds of the same class.
2. Give explicit directions for developing and fitting a draft horse for market.
3. Outline a policy in horse breeding for the man on the average farm and state why you make the various suggestions.
4. Discuss the various essentials of Market Value in Horses.
5. Write a carefully worded article on "Action in Horses."

DAIRY CATTLE AND SWINE.

Examiner—H. BARTON, B.S.A.

1. From the standpoint of desirable type compare the three breeds of dairy cattle—Holstein, Ayrshire and Jersey. Contrast modern type with that more or less original in each of the breeds mentioned and state what the tendency in this connection is at the present time.
2. Estimate the cost of milk production generally in Ontario and outline a system of improvement which would tend to make for most economical production of milk on the average farm.
3. Give explicit directions for the management of a first class pure bred dairy herd in order that a high standard of excellence may be maintained.
4. Frequently there is considerable controversy on the question "Profits in hogs". Argue this question and cite experiments to substantiate your argument.
5. In reference to swine write notes on the following:-
(a) Choice of breed (b) Age to breed (c) Choice of feeds
(d) Time for litters.
6. Discuss the housing of brood sows.

BEEF CATTLE AND SHEEP.

Examiner—H. BARTON, B.S.A.

1. Write an account of the history of Shorthorn cattle. Mention the names of men who have had most to do with the development of the breed and indicate clearly the nature of their respective influences. Discuss the popularity of the breed in this country.

2. Discuss the principles of "Profitable Steer Feeding" and illustrate by reference to the practice on Ontario farms.

3. Write an article on "Canadian Cattle Markets"

4. Mention the peculiarities you would expect to find in carcasses from sheep typical of the following breeds:- Leicester, Lincoln, Dorset Horn, Shropshire, Southdown.

5. Discuss the present status of the sheep industry in Canada.

6. Give explicit directions for the feeding and management of a flock of breeding ewes during winter and at lambing time.

FEEDS AND FEEDING.

SPECIALISTS IN AGRICULTURE.

Examiner—G. E. DAY, B.S.A.

1. Write brief notes upon the peculiarities of composition and the utility of the following:- (a) Barley, (b) Cottonseed meal, (c) Timothy, (d) Red Clover.

2. Discuss the scientific use of corn (grain) in feeding stock.

3. Write a short article upon the value of leguminous crops for green forage and hay.

4. Discuss the rational use of corn silage, and the kinds of stock to which it may be fed.

5. Discuss the factors which influence the composition of cow's milk.

6. Briefly state the findings of Experiment Stations in regard to either *one* of the following topics:-

(a) Fattening steers on pasture vs. Stall Feeding.

(b) The use of alfalfa in feeding swine.

PRINCIPLES OF BREEDING.

Examiner—R. W. WADE.

Specialists in Agriculture.

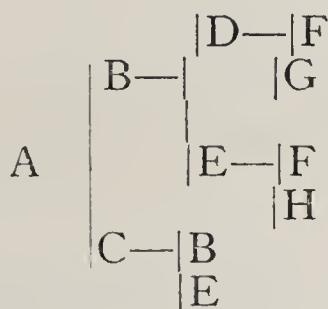
1. In the following extended pedigrees of famous animals, give:-

(a) The system of breeding followed.

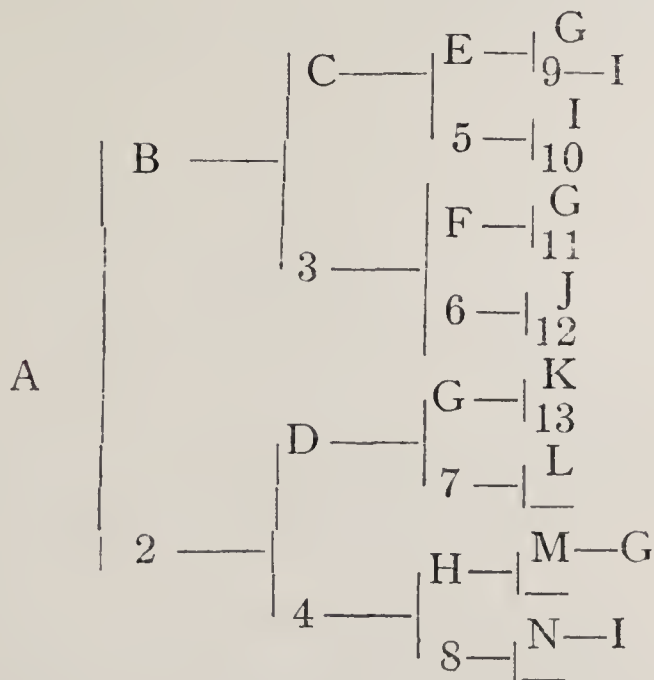
(b) The breeder's probable reasons for following such a system.

(c) Scientific reasons why each system might be successful.

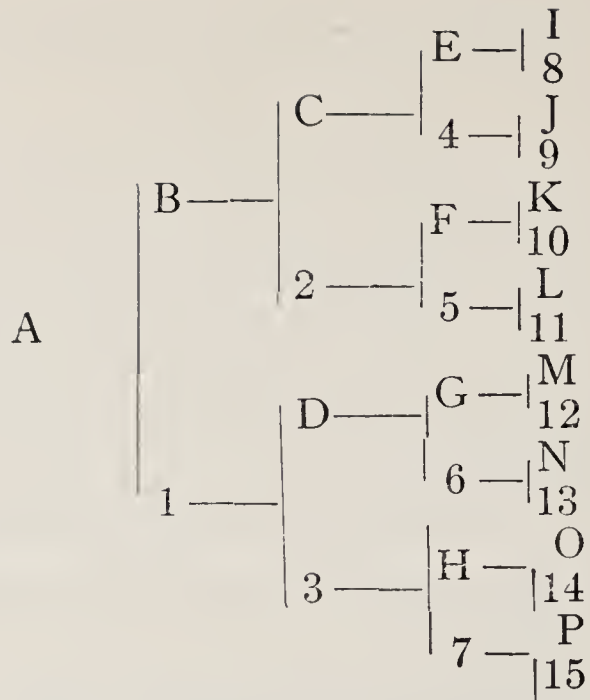
(1)



(2)



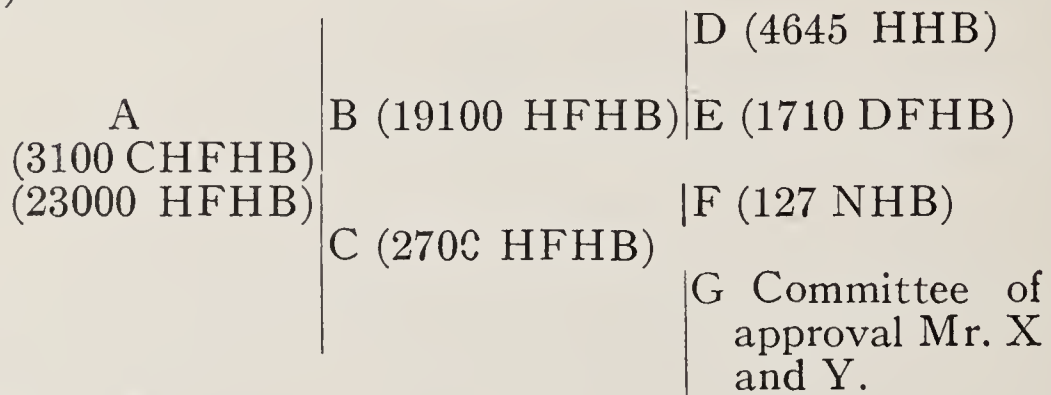
(3)



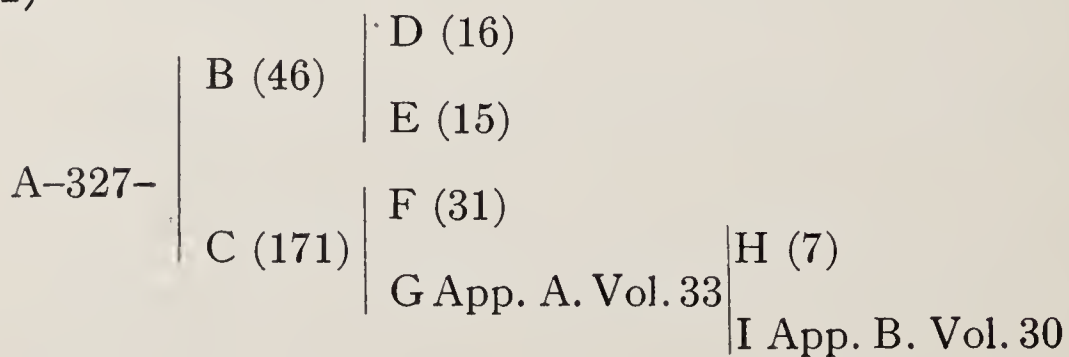
2. From the data given in the following extended pedigrees, give in each case:-

- (a) The breed.
- (b) The history of the animals.
- (c) The requirements for registration of each breed.

(1)



(2)



3. Give the rules for registering Clydesdales and Shorthorns in Canada. Point out any strong points in the rules. Suggest any changes that you think might improve the position of either breed in this country.

4. Define or illustrate the following terms, and show how an appreciation of their existence is of the utmost importance to the would-be successful breeder.

- (a) Dimorphism in improved breeds.
- (b) Exclusive and blended inheritance.
- (c) Regression.

5. Write a short careful article having for its title, "Selection".

STOCK JUDGING.

(PART I—PRACTICAL)

Examiner—R. W. WADE.

1. Place, with reasons, the class of Leicester ewes.
2. Place, with reasons, the market class of sheep.
3. Place the teams of agricultural horses in order of merit, giving reasons.
4. Place, with reasons, the class of Clydesdale mares.
5. Criticize: (a) The heavy draught gelding. (b) The team of carriage horses.

STOCK JUDGING.

PART II—PRACTICAL.

Examiner—R. W. WADE.

1. Place with reasons:- (a) Class of Holstein cows; (b) Class of Ayrshire cows; (c) Class of young calves.
2. Compare the values of the Yorkshire sows.
3. Place, with reasons, the class of bacon hogs.
4. Place, with reasons:- (a) Class of Shorthorn cows; (b) Class of Aberdeen-Angus cows. (c) Class of Beef Calves.

POULTRY.

Examiner—H. B. WEBSTER.

1. Write an article on the science of feeding laying hens, with special regard to meat foods.

2. Compare the natural method of incubation with that in a sand-tray Prairie State incubator. Give details for the management of an incubator, and give reasons for all important points in such management.

3. How would you advise a farmer to rear incubator chicks, until ready for the laying pen, or for the market as crate-fed roasters?

4. Give causes for white diarrhoea and avian tuberculosis. State post-mortem symptoms of each, also preventatives.

5. How would you construct a suitable building to hold 150 hens—for the section north of Newmarket.

6. It has been found through a biometric study of egg production, that purely selective methods will not produce 200-egg hens. How are they produced?

7. In relation to eggs, give causes for blood-ring, mould, infertility, heated, blood-spot, double-yolk.

8. How would you form a new breed of poultry, possessing the following characteristics :- suitability for broiler and all-year egg production, medium size, white color, rose comb, yellow legs, brown eggs.

PRACTICAL POULTRY.

Examiner—N. R. GRAHAM

1. Select a trio suitable for producing 2-lb. broilers.

2. Select a trio for the production of capons.

3. Compare males 3 and 4 as breeders of market poultry.

4. Describe how the two incubators are manipulated during a hatch.

5. Explain the workings of the brooder on exhibit.

6. Explain in detail the digestive tract of the two birds on exhibit.

CHEESE MAKING AND MILK TESTING.

Examiner—FRANK HERNS

(Specialists in Dairying.)

1. (a) Write brief practical instructions to a milk producer which if followed will enable him to deliver sweet, clean flavored milk to a cheese factory at all seasons of the year.

(b) How may the cheese maker know that the milk delivered at the factory is in good condition for cheese making?

2. What conditions are likely to deceive a cheese maker with reference to the proper time for:

(a) Setting the milk.

(b) Drawing off the whey?

3. What changes are taking place in the curd and whey during the time from "Cutting" to "Dipping"?

4. (a) What are the chief factors that influence the yield of cheese?

(b) Does the Canadian Law specify how much water Cheddar Cheese should contain? If not, why not incorporate large quantities of water in the cheese?

(c) At what season of the year do curds require the most salt? Why?

5. Discuss briefly the following tests as applied to Cheddar cheese making, mentioning the strong and weak points of each. (1) Rennet. (2) Acidimeter. (3) Hot Iron.

6. Discuss briefly:

(a) Curing Rooms.

(b) Proper handling of cheese factory whey.

(c) Disposal of cheese factory waste water.

7. (a) What are the chief defects found in Canadian Cheddar Cheese?

(b) Discuss briefly the reasons for and methods of preventing these defects.

8. Discuss briefly:

(a) The Babcock Test

(b) The Quevenne Lactometer.

(c) Composite samples.

(d) Weighing cream samples for the test.

9. A milk producer states "When my cows were fed on corn meal the percentage of fat in the milk increased".

Criticise this statement.

10. (a) Mention three methods of paying for milk at cheese factories.

(b) Discuss briefly the advantages and disadvantages of each method.

11. (a) A sample of milk tests (when delivered at the cheese factory) 3% of fat and has a lactometer reading of 25. What steps would you take to prove this milk is deteriorated?

(b) A thirty gallon can of milk (in good condition) is poured into the factory weight can. At the end of five minutes a sample is taken from the top and the bottom. Will there be any difference in the lactometer readings and fat tests of these samples? Account for the difference, if any.

12. Milk dealer offers producer \$1.00 per hundred lbs. for milk testing 3.3% of fat and 1 cent extra for each .1% of fat the milk tests above 3.3%. Cream dealer offers for cream 30 cents per lb. of fat. The milk furnished by producer tests 3.8% of fat. From the standpoint of cash returns to which dealer would you advise producer to sell. Show by figures why.

CREAM SEPARATORS AND BUTTER- MAKING.

Examiner—FRANK HERNS

(Specialists in Dairying.)

1. Discuss briefly the important points to be observed in locating and using a hand separator, giving arguments why these points are important.

2. Explain briefly how hand separator cream should be handled in order that it may be in the best condition when delivered at the creamery.

3. The cream delivered to the creamery by patron No. 1 does not vary in test from month to month while that delivered by patron No. 2 does vary.

(a) Has patron No. 1 any reason to be dissatisfied with the test?

(b) Discuss the possible causes for the variations in the test of the cream delivered by patron No. 2.

4. Many hand separators have "Skimming devices". Explain why.

5. (a) What is meant by "Cream raising co-efficient".

(b) What four conditions influence the cream-raising co-efficient in connection with separators.

6. The statement is made, "Our Separator will give you more cream than any other separator on the market". Criticise this statement.

7. State briefly the advantages and disadvantages of churning:

(a) Sweet cream.

(b) Ripened cream.

8. (a) What is meant by "Churning cream".

(b) Discuss the chief factors that control the time required to churn cream.

(c) Give brief instructions for keeping a churn in first class sanitary condition.

9. Discuss briefly the chief factors that control in butter the:

(a) Moisture content.

(b) Color.

(c) Texture.

(d) Amount of salt retained.

(e) Loss of fat in the buttermilk.

10. The creamery overrun is 5%. Explain:

(a) Overrun.

(b) The possible reasons why the overrun was not greater.

(c) What is the maximum (Canadian) legal overrun. (Show figures for C.)

11. Discuss briefly:

(a) Pasteurization of cream.

(b) Effect of pasteurization on the buttermilk.

(c) Grading cream as applied to our cream collecting creameries.

12 (a) Describe "Finest butter".

(b) Give some causes and remedies for bad flavors in butter.

13. It has been said "Oleomargarine and renovated butter should be allowed to be made and sold in Canada." Criticise this statement.

PRACTICAL EXAMINATION IN BUTTER- MAKING.

Examiner—FRANK HERNŠ.

(Specialists in Dairying.)

1. Make a churning.
 - (a) Keep a record of the process; test the cream for fat.
 - (b) Handle to have proper sized granules.
 - (c) Small loss in the buttermilk.
 - (d) Moisture and overrun consistent with good creamery practice.
 - (e) Test butter for moisture, fat and salt.
 - (f) Aim at perfection of quality and finish of package.
2. Score two packages of butter. Note defects in quality, if any.

PRACTICAL EXAMINATION IN CREAM SEPARATORS.

Examiner—FRANK HERNŠ.

(Specialists in Dairying.)

1. Illustrate with a hand cream separator the effect of variation of inflow upon;
 - (a) The percent of fat in the cream.
 - (b) The percent of fat left in the skim milk.

PRACTICAL EXAMINATION IN CHEESE- MAKING.

Examiner—FRANK HERNŠ.

(Specialists in Dairying.)

1. Make a Cheddar Cheese.
 - (a) Keep a record of the process.
 - (b) Test the milk for fat and casein.

(c) Compare the rennet with the acidimeter test at setting.

(d) Compare the hot iron with the acidimeter test at dipping.

(e) Test the whey for fat at dipping.

(f) Endeavor to secure perfection of quality and finish, also the greatest yield of cheese consistent with the highest standard of quality for export Cheddar cheese.

2. Score two Cheddar cheese. Note from "Export trade standpoint" the defects in quality, if any.

3. Illustrate "The Curd Test".

PRACTICAL EXAMINATION IN MILK-TESTING.

Examiner—FRANK HERNES

(Specialists in Dairying).

1. Make a correct control test of a sample of whole milk. Illustrate at least five important details any one of which if not observed may cause other tests of this milk to vary from the control test. Keep a brief record of the work.

2. Show any difference in the test of fat in cream a sample of which is taken by:

(a) Volume.

(b) Weight.

(c) Account for the difference if any.

(d) Show how by neglecting to observe one important point at the time of reading the fat, the reading may be incorrect.

3. The examiner will prepare samples. Using these samples give a practical demonstration of your ability to detect:

(a) Watered.

(b) Skimmed.

(c) Watered and skimmed milk.

(d) Show in percentages the extent of deterioration.



University of Toronto

DEPARTMENT OF VETERINARY SCIENCE.

ANNUAL EXAMINATIONS
1912.



VETERINARY PHYSIOLOGY.

Examiner—T. G. BRODIE.

(Six questions only to be answered.)

1. Describe the means by which the flow of the blood is maintained through the heart from auricle to ventricle, and thence to the aorta.
2. Compare the composition of expired and inspired air. Explain the mechanisms which lead to the expansion of the lung at each inspiration.
3. What is the composition of pancreatic juice? What is its action?
4. Describe the main changes to which the food is subjected in the large intestine.
5. What do you know of the origin of urea in the animal body? What is its significance?
6. Give a short account of the functions of the spleen.
7. Write a short account of the secretion of urine by the kidney.
8. How may lymph be collected? How is it formed and what is its use?

CONTAGIOUS DISEASES OF ANIMALS.

Examiner—E. A. A. GRANGE, V.S. M.Sc.

1. Name five contagious diseases which may affect cattle or horses.
2. Name the differences in the symptoms of anthrax and symptomatic-anthrax.
3. How does glanders differ from tuberculosis?
4. Name the causes and give the symptoms and treatment of tetanus in the horse.
5. Name the causes and give the symptoms and treatment of contagious foot-rot in sheep.
6. How may febra-pyogenica in the horse be distinguished from glanders?

7. Give the symptoms and treatment of foot and mouth disease in cattle.

8. How do contagious diseases enter the economy of a horse?

9. Name three diseases in the horse caused by trypanosoma.

10. How may actinomycosis be distinguished from other diseases in cattle?

SPORADIC DISEASES OF THE HORSE.

Examiner—J. N. PRINGLE, M.R.C.V.S.

Time—2½ hours.

1. Give the symptoms of Pharyngitis and explain why Pneumonia is so liable to occur as a complication in severe cases.

2. What constitutes a sidebone, give treatment and explain the bearing sidebones may have in regard to the soundness of horses.

3. Give the symptoms and treatment of Acute Cystitis.

4. Give the General symptoms of Valvular disease of the heart.

5. Give the treatment of Acute indigestion in foals "2 weeks old."

6. Give the differential diagnosis between Croupous, and Broncho-Pneumonia and give the Post Mortem appearances of the former.

7. Give the causes and treatment of Constipation Colic.

8. Give the Post Mortem appearances of an animal killed by lightning.

9. Mention the more common causes of contracted heels in horses, and in the treatment of same in a hunter, mention what kind of shoe you would apply, explaining how the use of such a shoe will benefit the condition.

10. Give the treatment of Chronic Laminitis associated with dropped sole, mentioning particularly the form of shoe to be used, and how it is to be fitted to the foot.

SPORADIC DISEASES OF CATTLE.

Examiner—W. J. R. FOWLER, V.S., B.V.Sc.

Time allowed 2 hours.

1. State the symptoms and treatment of mercurial stomatitis.
2. Give the causes, symptoms and treatment of dysentary.
3. Give the causes, symptoms and treatment of Œsophagitis. Mention unfavorable terminations.
4. Describe symptoms presented when an animal is struck by lightning. Mention post mortem appearances.
5. When foreign substances are present in Rumen and Reticulum mention symptoms presented. What foreign substance may be found there?
6. Give causes, symptoms and treatment of Rumenitis.

OBSTETRICS.

Examiner—W. J. R. FOWLER, V.S., B.V.Sc.

Time—2 hours.

1. Define the following terms:—
Fecundation, sterility, monstrosity, Meconium, Colostrum, Freemartin.
2. Name the appendages of the foetus.
3. Name the structures in the umbilical cord of a calf.
4. What changes take place in the uterus from conception until parturition.
5. Describe the Allantois.
6. Give the symptoms and treatment of hydrops-amnii in a cow.

SURGERY.

Examiner—W. J. R. FOWLER, V.S., B.V.Sc.

Time—2 hours.

1. Describe briefly the covered operation in castration. State where it is indicated.
2. Give the causes, symptoms and treatment of hydrocele in a gelding.
3. Describe the operation of vaginal ovariectomy in a mare. State where indicated.
4. Give method for castration of a cryptorchid bull.
5. Give the treatment for chronic tendonitis.

MEAT INSPECTION.

Examiner—A. C. WALKER, V.S., B.V.Sc.

1. Describe the macroscopical difference between the lungs, liver and kidneys of the Sheep and Hog.
2. Give the post mortem lesions in Toxaemia and state briefly the characteristic differences between this disease and Septicaemia on post mortem examination.
3. State the difference between a primary and secondary affection of the lungs in Tuberculosis.
4. Name three cysticerci of food animals, give the name of the mature worm and its host.
5. How would you differentiate between a Pentastome and a Tubercular affected lymph node?
6. In what part or organ and in what animal are the following parasites found?
 - (a) Echinorynchus gigas.
 - (b) Strongylus Contortus.
 - (c) Anguillula Aceti.
 - (d) Oesophagostomum Columbianum.

7. You have a carcass which on post mortem reveals the following actinomycotic lesions:

Inferior maxilla, lungs, mediastinal lymph, nodes and liver. Is this a localized or generalized condition? What would be your judgment on a carcass so affected?

8. Give the post mortem appearance of an animal slaughtered in a dying condition. On what grounds would you base your disposition of such a carcass?

9. Describe the post mortem appearance of either of the following:

(a) Muroid degeneration.

(b) Melanaemia.

10. What constitutes an immature animal? Describe the post mortem appearance of an immature calf. What is the chief reason for condemning animals in this condition?

MILK INSPECTION.

Examiner—D. KING SMITH, M.B., V.S.

TIME: TWO HOURS.

All questions of equal value.

1. (a) Give formula of normal milk.

(b) Give differences between normal milk and colostrum milk.

2. What conditions may influence the quality of a cow's milk?

3. Explain fully why the acidity of milk is increased on standing. What precautions would you advise to overcome this?

4. Write a short paper on the dangers of impure milk.

VETERINARY-HYGIENE.

Examiner—E. A. A. GRANGE, V.S., M.Sc.

Time—Two hours.

1. Name hygienic methods for preventing the spread of contagious disease.
2. How may improper care of the skin affect the health of an animal?
3. Name three diseases which are likely to occur in horses when they are driven fast after, say, 10 days rest in the stable and allowed full feed.
4. What advantages, from the hygienic standpoint, will follow the proper application of bandages?
5. Name 5 diseases which may result from improper harness, or the improper application of harness.

DAIRY INSPECTION.

Examiner—H. E. HURD, V.S.

TIME : TWO HOURS.

1. Name the important breeds of dairy cattle.
2. Name the diseases communicable through the milk, the milk becoming infected after it leaves the udder of the cow.
3. By what means may milk become infected after it leaves the udder of the cow?
4. In inspecting a dairy farm, what are the conditions which would lead you to suspect impure water?
5. What precautions on the part of the milker are necessary to insure clean milk?
6. In the housing of dairy cattle give the essentials necessary for a pure, clean milk.

PATHOLOGY.

Examiner—D. KING SMITH, M.B., V.S.

Time—2 hours.

1. Describe fully the changes taking place in the lung in stage of red hepatization of croupous pneumonia.
2. What are the theories given regarding the causes of Haemoglobinuria (Azoturia). Explain fully McFadyen's View.
3. A liver is enlarged; what might the enlargement be due to?
4. Describe the microscopic appearance of a typical tubercle.

BACTERIOLOGY AND PROTOZOOLOGY.

Examiner—JOHN A. AMYOT, M.B.

1. Define Infective agent, saprophyte, Antitoxin, Bacteriolysin, Agglutinin and Putrefactive products.
2. Describe the infective agent of Texas Fever. How is the disease transmitted?
3. What are the natural protectives against the entrance of infective agents into the body?
4. What is the role of insects in the transmission of infections?
5. How would you prove that in a given case the anthrax bacillus was the cause of the disease?
6. Indicate the sources of bacteria (pathogenic and non-pathogenic) in milk. What does an ordinary bacterial count mean with reference to a given sample of milk?

MATERIA MEDICA.

Examiner—C. A. TEMPLE, M.D., C.M.

Time 2 hours.

1. Describe the differences between vaccines, serums and Bacterins. Give a sample of each with the indications for use.
2. Give doses and method of use and indications for Aloin, Gamboge, Croton oil, Eserine and Arecoline.
3. Describe the actions and uses of the Digitalis Group and name the individual Drugs.
4. Describe briefly the drugs used in respiratory diseases, and their indications in treatment.

ZOO-TECHNICS.

Examiner—C. F. BAILEY, B.S.A.

Time—2½ hours.

1. Give definitions for the following terms: Nutritive Ratio; Ash; Protein; Maintenance Ration; Balanced Ration.
2. Compare the relative value of the following feeds for stock:
 - (a) Clover Hay, Timothy Hay, Alfalfa Hay.
 - (b) Oats, Barley, Wheat, Peas.
 - (c) Wheat Bran, Corn Bran, Gluten Meal, Cotton Seed Meal.
3. Give a Classification for Swine, including at least three breeds in each class.
4. Describe briefly how you would feed and care for a flock of ewes throughout a whole season.
5. Name the five points to be kept in mind while judging dairy cattle and give reasons for doing so.

6. Define the following terms:—

- (a) Substantive Variation,
- (b) Merestic Variation,
- (c) Prepotency,
- (d) Hereditary,
- (e) Functional Variation
- (f) Mutation.

7. Give briefly your views regarding the horse breeding industry of Ontario, and suggest methods which may be adapted by the farmers that would tend toward improvement.

VETERINARY JURISPRUDENCE.

Examiner—DYCE W. SAUNDERS, K.C.

Two hours and a half.

1. *A* has a pair of horses. He verbally agrees to sell one to *B* and the other to *C* for \$200 each, the horses to be delivered and to be paid for on the following day. The next day *B* says he has changed his mind and refuses to accept the horse or pay for it. *C* takes the horse he agreed to buy and tells his servant to drive it away and put it in his stable, but does not pay over the \$200.

What remedy (if any) has *A* against (1) *B*; and (2) *C*? Give reasons.

2. A farmer drives into town and ties his horse at the side of the street beside the sidewalk. While standing there the horse bites a passerby. Can the owner be held liable to the person bitten? Give reasons.

3. *A* takes in cattle to pasture on his land. One of his fences has got out of repair, and by reason thereof one of the cattle is injured. Is *A* liable for the injury to the animal? If so, why?

4. *A* hires a horse from a livery stable keeper. After using the horse he tells his servant to drive it back to the livery stable. In doing so the servant carelessly drives over a person crossing the street. Has the latter an action for damages against anyone? If so, against whom? Explain.

5. *A* borrows a horse from *B*. The horse when returned is found to be injured. State some of the considerations which might make *A* liable to pay for the injury.

6. Explain (a) "unsoundness" and (b) "vice" as applied to horses, and give two examples of each.

CANINE AND FELINE DISEASES.

Examiner—C. G. J. SAUNDERS, V.S., B.V.Sc.

1. What is entropion? Describe in detail an operation for its relief.

2. Give causes, symptoms and treatment of canker of the ear.

3. Give the common causes and treatments of convulsions in puppies and cats.

4. Give cause, symptoms and treatment of ptomaine poisoning.

5. Give symptoms and treatment of impaction of the intestines.

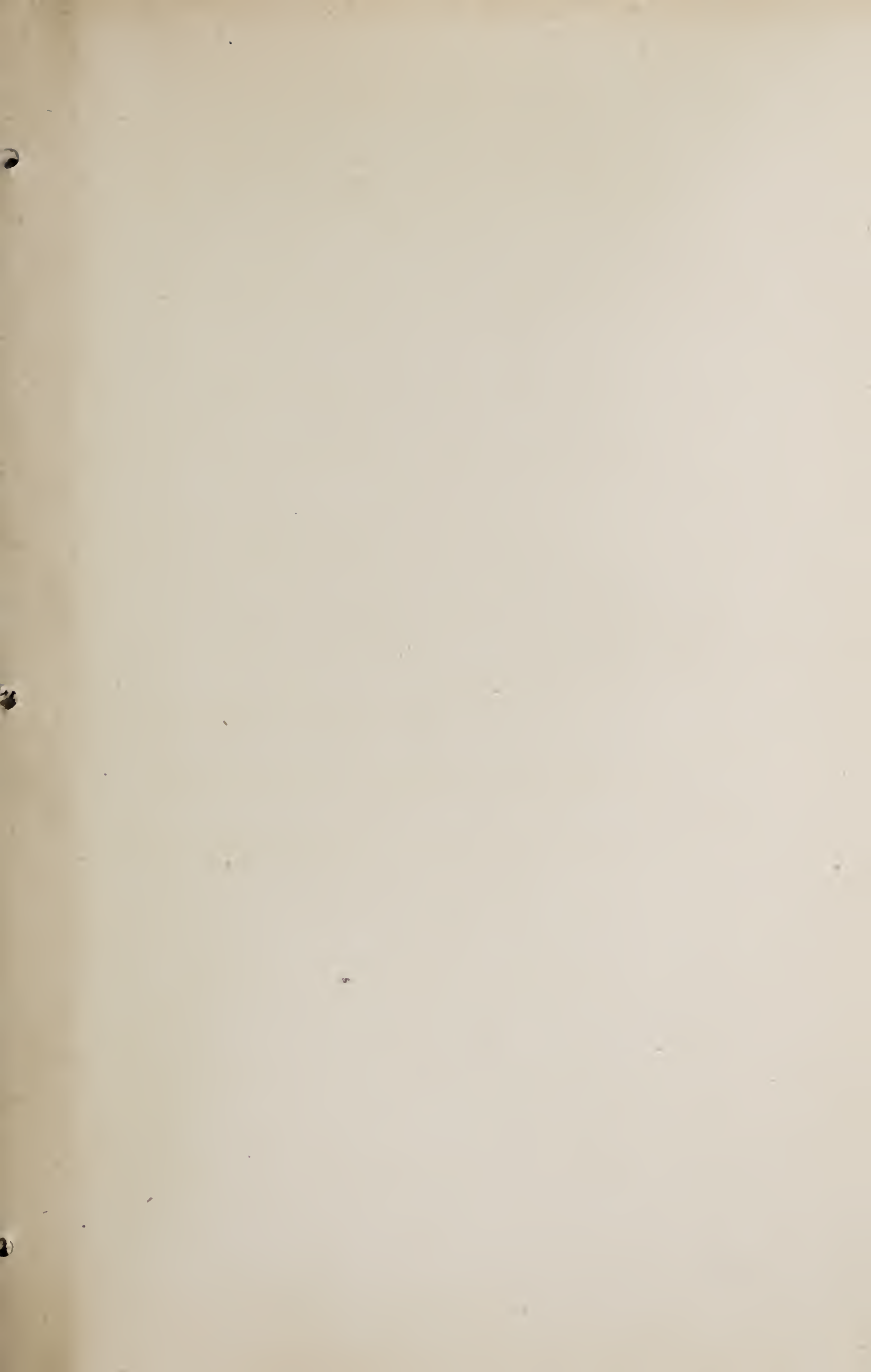
6. Give differential diagnosis of eczema, sarcoptic and follicular mange. Prognosis of sarcoptic mange in cat. Follicular mange in dog.

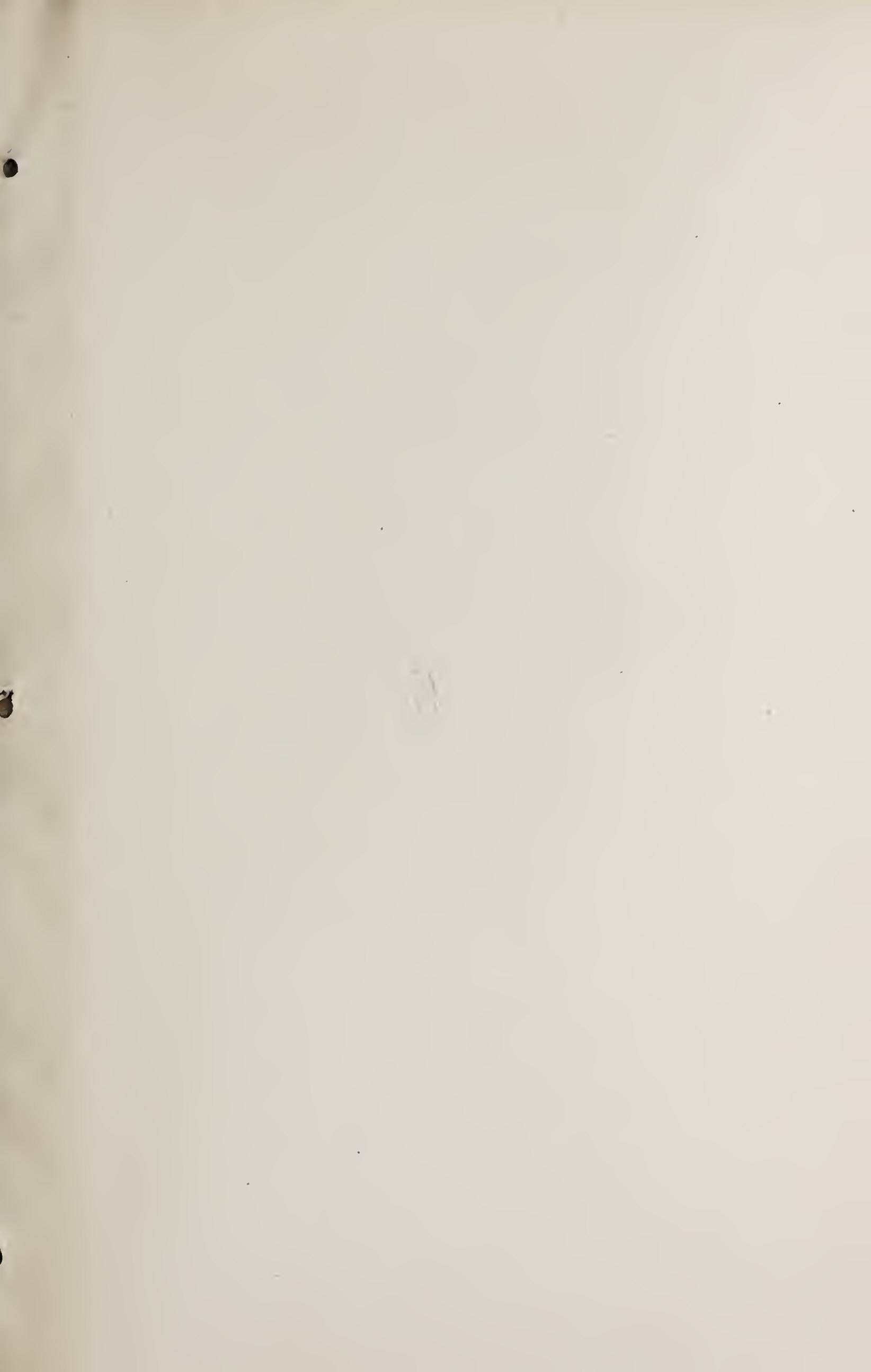
7. Give symptoms and treatment of pneumonia.

8. Give symptoms and treatment of distemper in a case where the digestive organs are chiefly involved.

9. Give causes, symptoms and treatment of abdominal ascites.

10. Give causes, symptoms and treatment of cystitis.







27

A

